Old Series, Vol. LXI

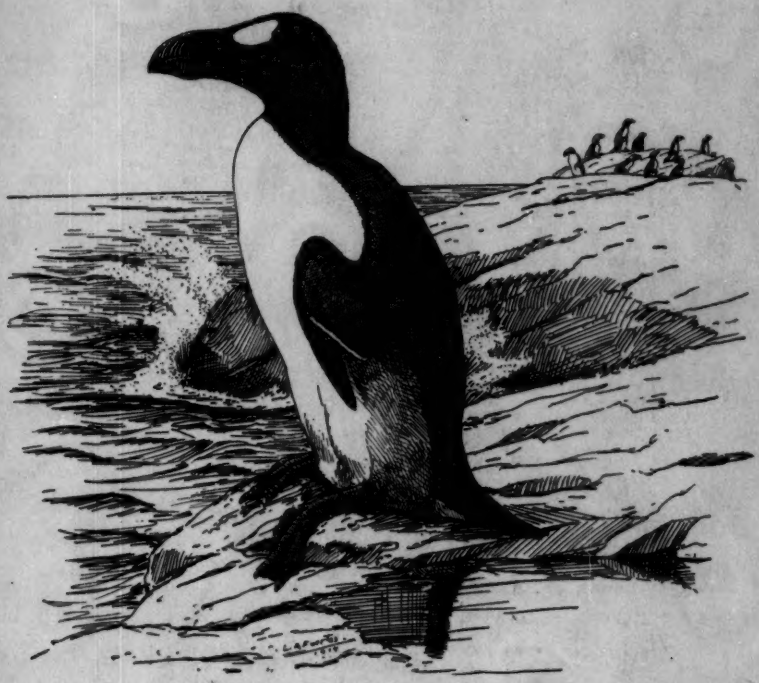
CONTINUATION OF THE BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New Series, Vol. LIII

The Auk

A Quarterly Journal of Ornithology

Vol. LIII APRIL, 1936 No. 2



PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

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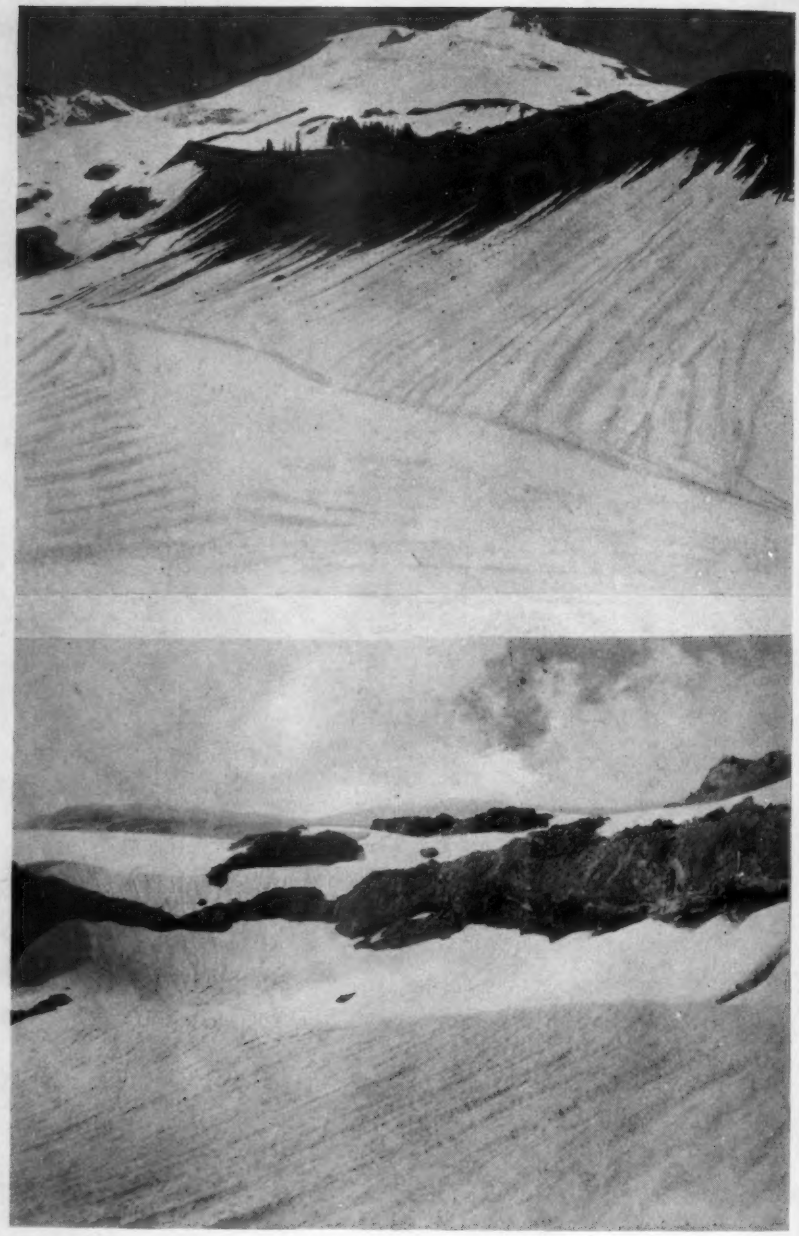

Photos by Wm. T. Shaw.

UPPER: EAST MORAINE OF EASTON GLACIER, MT. BAKER, WASHINGTON. A SUMMER HOME OF HEPBURN'S ROSY FINCH.
LOWER: RHYOLITE OUTCROP, WHERE THE BIRD NESTS.

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A QUARTERLY JOURNAL OF ORNITHOLOGY.

VOL. LIII. APRIL, 1936. NO. 2.

WINTER LIFE AND NESTING STUDIES OF HEPBURN'S ROSY FINCH IN WASHINGTON STATE.

(Part II. Summer: Nesting.)

BY WILLIAM T. SHAW.

Plates VIII–X.

IT WAS greatly desired to find the nest of Hepburn's Rosy Finch and learn of its breeding habits. An extended study of the published accounts on the subject of its nesting showed very little exact information and consequent need of investigation in the remote fields of its Arctic-Alpine habitat. The task of finding its nest was difficult yet most alluring.

On August 6, 1924, while arranging for a photographic exposure upon Mount Baker, in central Whatcom County, Washington, my attention was drawn by three small birds coming down out of the upper air and alighting upon the tip-top branches of a high mountain hemlock (*Tsuga mertensiana*) which stood in the last clump of trees at snow line upon an old heather-grown moraine. Through the binoculars they looked like Pine Siskins (*Spinus pinus*) but their identity was in doubt. On nearer approach the familiar chirp of the Rosy Finch (*Leucosticte tephrocotis littoralis*) was heard and in a moment they descended to a patch of snow upon the rocky sides of the new moraine and faded out of the landscape, so nicely did they blend in with the rocks about them. Closer contact showed them industriously gleaning from a bunch of last-year's lupines, (probably *Lupinus volcanicus*) and from tufts of rushes (*Juncus*) both of which grew beside this moraine. Adding to the interest was the presence of a mother Ptarmigan (*Lagopus leucurus rainierensis*) and four one-third grown young, all in the space of about 20 feet square. Both species were tame and permitted an approach of ten feet in the case of the Ptarmigan and fifteen in that of the Rosy Finches. There were three birds in the Finch flock, all dull-colored, and at least two of them were young. Pressed too closely, one of them uttered the "let's be off call"—"*weep-weep*," so

interestingly given in winter at their feeding box on occasions when no food had been provided for them, and presently they were in the air and undulating down to a lower snow bank. Here they permitted close observation and were seen walking diligently in search of food upon the snow. One attacked a dipterous insect, another investigated a cone of the high mountain hemlock. After a few minutes of this, they raised on wings sufficient to carry them over the moraine in the direction of the great glacier. This was the second time they had been seen this summer, both times near great quantities of ice and snow. These seemed to be post nesting rovers as they were not seen the following day. This observation at least told us something of their probable time of nesting and incidentally too, something of their nesting habitat for it was not over half a mile from here that our first nest to be found was located five years later, and that the final success of the original quest was achieved ten years after, in 1934.

Yet this was not the first indication which had come to me of their home life in the high mountains. On August 22, 1919, while accompanying the Biological Survey investigations in the State of Washington, under the leadership of Dr. Walter P. Taylor, fledglings, still on uncertain wings were observed at an elevation of about 7000 feet, upon Burroughs Mountain, Mount Rainier. So recently had they left the nest and so clumsily were they using their wings that they became the object of interest to one of the foals whose mother was among our pack horses and bore an investigation by this youthful equine, prompted by curiosity, as they fluttered conspicuously over the rocks by the trailside. Again on July 25, 1924, a Rosy Finch had been observed at an elevation of 5800 feet, on Glacier Peak, Snohomish County, Washington. One, apparently a female was seen here on two days and appeared to be nesting as she was concerned with the presence of two Sparrow Hawks (*Falco*) in her neighborhood. The bird remonstrated with them from the tree tops, though she was seen at times on the flat rocks near the snow. The excited call, accompanied by nervous wing-twitching was being given. Once more on the eighth of August, 1924, at an elevation of 6000 feet, they were observed on Deming Glacier, Mount Baker, Washington. Never before did I realize the source of color of the Rosy Finch until three were seen to rise twittering out of the foot of the ice cascade of the Glacier and disappear over the cliffs to the south and east. Here were tones of brownish and gray hues such as to render the bird all but invisible when it came to earth. Again, at an elevation of about 6000 feet, upon Mount Stuart, Chelan County, Washington, on July 24, 1925, adult Rosy Finches were present, though no fledglings were seen upon the feeding areas. With these suggestions as to nesting habitats, and probable time of nesting, we undertook our first determined effort to obtain information upon them in 1929, choosing Easton Glacier, Mount Baker, Washington as the field.

Nesting Habitat.—With the idea that they would likely be found nesting around rocky cliffs, gained from the fact of their being so persistently observed near them and from the fact of their tendency to cling to brick walls in and about the buildings at Pullman, where they were also observed entering windows, and roosting on ledges of brick walls in sheltering porches, and above all from noticing that they were entering the Cliff Swallows' nests along the Snake River, suggested to us that they would be very apt to select rugged cliff outcroppings for a nesting habitat.

So, remembering their former occurrence at Mazama Park, Mount Baker, Washington, I determined to reach this camp, if possible, earlier than on former years. Approaching the Mountain on July 1, 1929, we found the forest rangers reporting great quantities of snow in the high mountains. Hesitatingly we ventured in, camping for the night at a deserted trapper's cabin, still wet and chilly from its recent liberation from snow. That afternoon a reconnoitering party visited the upper country of the moraines to find great fields of snow extending widely, with here and there a wind-swept shoulder of an old moraine blown free. Here, in the shelter of a clump of one of those brave outposts of high mountain hemlocks in full view of the great dome itself and only a short step from Easton Glacier, we decided to establish camp. The Park was almost entirely covered with hard granular snow, averaging about three feet in depth and open only around the park-like clumps of trees. Our horses could travel over it however and not go through too deeply even in the late afternoon. We returned to the lower camp.[1]

The night was fine and clear and our hopes of getting the pack-ladened horses up and over on hard snow early in the morning were high. Dawn however was far from that for our valley was fog-shrouded. Summoned to the difficult task of breaking and making camp in rain storm and fog, by the fine capability and courage of our packer Mr. George Ely, we sent the first load of camp outfit up. On his return Ely reported the ridge densely fogged. Later we appreciated this, since we could not see a hundred feet in any direction. Two boys, accompanying the first pack had been busy however, and snow had been shoveled out of our tree clump and a fire was under way,—the first token of home. The tent soon added the second touch and presently smoke curling from our Sibley stove completed the scene of comfortable occupation.

Slowly that morning the fog drifted out, revealing to those boys who had

[1] To those who have had no actual experience in the high mountains of the north in summer the mention of snow in June and July so persistently is apt to be misleading and convey a false impression of chilly atmosphere. Indeed far from being cold, the sunny days are very pleasant, the air from the warm lowlands drifting over the snow fields and making them very companionable. Of much greater concern, than the temperature is the blinding glare of the sun reflected from the snowfields.

come into this beautiful spot, blind-folded as it were, this lovely sight of wintry parks, alpine forested,—fog-steaming glacier moraines, forbidding black buttes and crowning all the miles and miles of near- and far-distant peaks. Time passed quickly those first hours and presently the great white form of Baker glowed warmly and silently in the lingering rays of the ending day. Lesser peaks, one by one, took on their cold ashen hues with the fading light. Soon we were to go into our first night on the high mountains.

Yes, as of other years, the Rosy Finches were there, feeding quite busily at the line of melting snow, hopping or walking silently along the snow edge of the vegetation-covered lateral moraine, seeking no doubt the last-year's seeds laid bare by the thawing snow. Silently, industriously, they fed, the only sound being the occasional faint swish of heather or huckleberry twigs released by the warm rays of the sun from the prone-pressed imprisonment by compacting winter's snows. Once one fluttered into the air, Junco-like, for a passing insect. Again one flew diagonally up for a distance of about 15 feet to bring down some small winged creature. But no more aerial maneuvers for such actions are rare with the Rosy Finches. After twenty minutes or so of this seed-searching, departing twitters were uttered and after flying once or twice from one prominent rock to another, the twitterings increased in the rapidity of departure and the birds, now usually in pairs, and seldom ever seen in groups of more than three or four, vaulted over the knife-edged, lateral moraine in the direction of the outcropping ledges of the upper glacier.

On July 10, it was decided to cross the cirque at the lower end of the glacier and study conditions along the east wall. The going was rather rough, with two glacial streams to cross, which by return in the evening were indeed formidable. This east moraine had been wind-swept in winter and was now free from snow and towards its upper reaches had stretches of wild flower gardens. Here also were Rosy Finches, five being seen in all. Two of them, after feeding, passed over my knife-edge perch and headed for a series of slab-strata and clinker domes in the upper ice, which retarded the flow of the glacier.

On July 11, Deming Glacier was visited and Rosy Finches found flying in the direction of its formidable walls which are very craggy. Around the precipitous cliffs, one pair especially was noted as if they were nesting there. On July 12, William Morris and the Anderson boys, my camp companions, accompanied me and we went directly up the cirque towards the low ledges of slabs and clinkers. A little after noon Don Anderson and I were ascending a slope, when an old Rosy Finch flew past on its way towards the upper rim-rock walls of the moraine. A little later Herbert Anderson reported hearing what seemed to be the chirping of young birds, though obscured by the noise of a water-fall. For the rest of our stay in this region

we neither saw nor heard any birds (Condor 1929). On returning, as I passed the wild flower gardens of the moraine, finches were seen feeding by the edge of the snow. They had come from the ledges beside the glacier and presently two of them left in the direction of the upper end.

In the evening I went over and over in my mind all the circumstances of these observations and was more and more convinced that the birds were nesting in the ledges of the moraine walls. I had hopes of being able to make one more effort. With food and rest came new courage and before dawn I had determined to go again in a final effort to find the nest on this last day before the packer came to take us out.

In the morning I announced my decision and was soon under way. Again two birds were seen on the east moraine by the gardens and snow patches but soon left towards the upper ledges. After about an hour's time I arrived above the ledges and looking down saw a Rosy Finch eagerly progressing over the snow, this time picking up benumbed insects. Her actions easily could be seen through the binoculars. For some minutes she continued this, moving in the direction of the water-fall. Here she flew in short successive flights up over the slippery stones until the snow fields beside me were reached, there to continue her insect searching. Finally after some restless chirping she flew to a little pool beside the snow for a splattering bath. After a dip she would shake out her plumage and flutter away a few feet only to return again. This she did four distinct times before dropping to the rocks below. Here, after a few moments she fluttered up under an overhanging ledge about 100 yards below the falls. For a long time I watched her point of disappearance, but she did not return. Marking the general position of her concealment, I cautiously lowered myself down over the incline to the snow field below. Now approaching the ledge under which she had disappeared I sat down on a pile of rocks and began making a study of the wall with the glasses. Here were domes of reddish, clinker-like, porous rock, overlain with flat stratified slabs of a very hard structure. Both formations were later referred by Dr. Wm. M. Tucker of the Fresno State College, to rhyolite, differently metamorphosed in cooling. Water dripped over about half of this area. The drier parts showed irregular gas-formed crypts here and there and in two of these appeared from the distance, that which looked like nesting material. One, at least, had what was distinctly shown as loose weathered ends of grass, though very old.

With this preliminary study, I next started across the snow. The first niche soon lost its favorable look, but the second still seemed hopeful. While standing on the sloping snow, glass to eyes, I heard a familiar chirp, the call of a returning Rosy Finch. With scarcely the pause of a moment she flew direct to the niche and eager mouths of better-than-half-grown fledglings rose to meet her. The long quest had ended!

The position of the nest was not easy of approach owing to the steepness of the snow leading up to the base of the overhanging ledge under which the crypt of the nest was located. Cautiously I worked my way to a point nearest the nest, focusing upon the nest cavity at a distance of about 10 feet. Sliding down to the rocks below, I sat there for a half hour watching the movements of the bird and trying to persuade myself to return for a lateral view of this overhanging ledge, for this was a dangerous outcropping of much cracked-up rock, as was shown by recently fallen slabs scattered here and there over the snow.

The nest looked much like that of a Robin, being open at the top, framed of grassy structure, probably *Juncus* or some related form. A nearer approach was impossible, for the crag was undercut about ten feet with the nest about half way back in the ceiling.

At times of feeding the young seemed to reach into the throat of the mother, uttering meantime high-sounding chirps resembling those of the common Eastern Kingbird (*Tyrannus*). The adults seemed not to be carrying visible food in their mouths.

So the 1929 season ended for us; we were to leave the mountains next day.

Studies of 1932.—It was not till 1932 that we had opportunity of returning again. On July 6, of that year, Mr. William C. Moore and I found ourselves established in camp at the foot of the east moraine of Easton Glacier. Deep snow would let our horses go no farther. The morning of that day, while Moore returned to the lower meadows with our horses, I started for the outcroppings at the head of the moraine. No Rosy Finches were sighted until about noon when one was observed. On arriving at the point where they had been found three years previously, the characteristic staccato note uttered in the region of the nest was heard and presently a bird was seen flying to one of the peculiar dome-like structures. On approaching it was seen dropping from a hole in the upper part of the soft substructure of the dome. The bird soon returned and there was no doubt about there being a nest with young in it. On this occasion there was but one pair of Rosy Finches on the east side of the glacier. From time to time down to the bare patches of red heather (*Phyllodoce empetriformis*), partridge-foot (*Lutkea pectinata*), rush (*Juncus*) and other forms of vegetation, for the moraine had been blown free. While most of the surrounding country was uniformly and deeply clothed with snow and ice, both slopes of this moraine were not only uncovered, but had an advanced growth of vegetation of about three weeks over the rest of the territory of even a thousand feet less altitude. After feeding, the birds flew over to the inside (glacier side) of the moraine and took a rather direct course up to the nesting territory. Once there, they usually perched once or sometimes twice, then flew direct

to the nesting site, pausing and looking about for as much as 10 or 20 seconds, before disappearing into the nest cavity.

Again, as in 1929, the nest was too high to reach, probably 15 feet up and overhung by dangerous slab-like formations. It was at about the limit of vegetation, only a very sparse growth of moss and lichens showing near the nest locality. Above the rock wall of the nest were a few scattered and stunted hemlocks, but only a very few and they were inconspicuous. A bunch of grass at the entrance of this nest crypt being the last vegetation seen.

The parent birds seemed only slightly concerned at the presence of the camera and operator, located probably not more than 15 feet from their nest. Sometimes they returned so silently that their presence was not detected until one glanced at their accustomed nest-side perch. Often as they approached they fluttered about and uttered staccato twittering notes, but not especially in alarm. Occasionally one heard notes from the nest, but no sound seemed to come from the young, as was the case in 1929, the little birds in this case probably being much younger.

Two old nests were found here in this porous rock, one almost directly below the occupied nest and about ten feet distant, the other at about the same level and about one rod down the glacier. The desirability of these nest crypts seems to depend upon the amount of snow which has fallen during the previous winter, for these old nesting cavities, now about on the level with the banks of snow were entirely and deeply hidden in 1933, while the occupied one of 1932 was just a little above the tip of the snow bank in 1933. The first of the two old nests was easy to reach and examine. It was placed in a rather open space in the rock, roughly speaking about 8 inches wide by 10 inches high. It was not a secure enclosure, but was penetrated by light from two or three small openings from the sides and back where the rocks did not fit tightly together besides being widely open from the front. In it the nest was set back about ten inches from the opening. This old nest was saved and will be referred to later.

Feeding seemed to be done by regurgitation, as the food for the nestlings seemed to be held in the throat of the parent and was not visible to the observer. Both male and female took part in the feeding of the young and the care of the nest, although the female seemed to make about three trips to one of the male. While in the vicinity of the nest, the male showed more spirit and animation than the female.

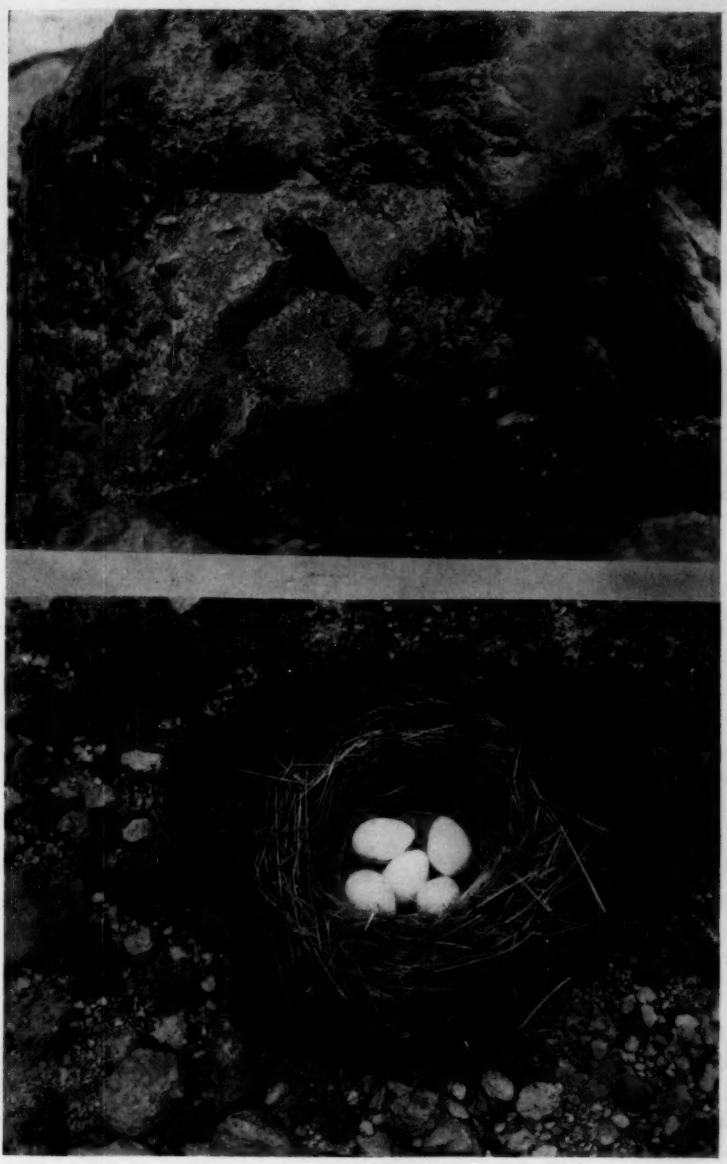
Flight up the glacier from the feeding grounds was rollicking and Finch-like but with long-drawn waves. Flutterings about the nest area were accompanied by a slight whir of wings and motions suggesting more weight of body than found in the Pine Finch for example.

Studies of 1933.—For two years we had failed to find the eggs of this bird

by being late in the field, and a glimpse of these would greatly help to complete our studies of this life history. This year it was determined to establish camp sufficiently early that our efforts should have more hope of success. June 14, 1933, found us in the timbered low country, expecting to go by pack outfit to our old camp site of 1932. The winter of 1932–33 had been one of exceptionally heavy snow fall and a reconnoitering party brought back word that miles of snow intervened between us and the old camp site of 1932, which indeed as a camp site was now non-existent, being completely obliterated by snow. The old cabin of 1929, a full-sized structure was completely snowed under, only the gables showing. The old nesting rimrock was all but buried and now wet and dripping from slowly melting snow. Yet a pair of finches was there, quite undisturbed, upon this warm heath of the lateral moraine from which winter winds had long since swept the snow. Here was a veritable budding garden.

Packers hesitated in the face of all this Arctic display. Again good food, a night's rest and a sunny morning awakening in the midst of that lovely lowland forest, brought new courage. We recalled a local mountaineer, Otto Willis,—"Yes, he would take us as far as horses could go." So in the course of a day or two, our packs were being pulled from our horses and piled in the shelter of a great fir in a gloomy forest of belated snow high on the mountain side. We had crossed about two miles of it, and horses could go no farther; from here on the entire outfit was back packed largely by Wm. Moore, at least two and a half miles nearer our desired goal. That night we slept in the old trapper cabin, entering at first by a gable window, later by steps of snow cut down to the door. On the 19th of June we found quite the only available clear space, from which the snow had been warded off by two large high mountain hemlocks and an Alaskan cedar (*Chamaecyparis nootkatensis*). Here, with a little shoveling, room was made for our tent on bare ground though the snow was fully eight feet deep nearly all around us. Soon the tent was up and a most comfortable bed of hemlock, tarps, and Hudson's Bay blankets was constructed. Moore, with back packing now completed, next cut a fine old dry Alaskan cedar for fire wood. Its 300 closely-set annular rings furnished a luxury of fragrant yellow wood for the 28 days we were in. The Sibly was soon heating the tent splendidly and the little camp grill presently was set up outside for cooking fine food. A few scoops of the shovel shortly produced a ready-to-hand cooler back in the depths of our bank in the purest of last winter's snows.

On this morning of the 20th, we made our first trip up the right lateral moraine, past our old camp of 1932, now five to six feet under snow, crossed about all the familiar glacial streams of '29, now deeply covered, without knowing they were there, except where they passed the base of trees. By and by we gained the moraine's knife edge where winter winds had swept



Photos by Wm. T. Shaw.

UPPER: HEPBURN'S ROSY FINCH IN FRONT OF NESTING CAVITY, JULY 8, 1934.

LOWER: NEST AND EGGS TEMPORARILY REMOVED FROM CAVITY, JUNE 17, 1934.

UNIV. OF MICH.

the snow into the cirques beyond, and here was spring,—far beyond our camp below. One could lie on the warm dry heather beds and luxuriate in the sun. From June 20 to July 6 the Glacier and its east side moraine were searched almost daily, yet no nest was found. The birds were there, one pair and an extra male, rather constantly. One of the males was giving the familiar spring twitter of animation and excitement and once was noted perched on a conspicuous boulder, with quivering wings as if displaying the beauty of his delicately tinted courting plumage. Yet we did not find the nest. The landscape was greatly changed from former years by the piles and piles of snow. However, we were learning something of the Rosy Finch, from day to day.

We had noted, long ago at Pullman, Washington, the habit of the birds of gleaning at the very edges of the last lingering snow banks, at the *moist edges* of them, during the last few days before their departure from that country in spring. A good feeding ground apparently, where might be found windblown seed of winter drifts, now gently lowered to the moist earth by melting banks. They were doing the same thing here! Silently, persistently and patiently, they would nimbly patrol this moist strip of earth by the edge of the snow. Even when they went down to the wild flower gardens, in bloom on the lower reaches of the moraine, they did not seek the warm dry earth but rather searched the moist edge of the remaining snow banks greatly restricted though they might be. When young are in the nest, it is noticeable that the times spent by individual birds in gleaning seems to synchronize very suggestively with the intervals of absence of the parent birds from the nest. On July 6, 1933, a Rosy Finch was observed, having found a flat wash of dead grass and silt still damp from its release from the edge of the winter compressing snow. Into this moist plat of earth it persisted in delving for some minutes with its beak. Close examination of this soil showed that there was a small blackish seed present, strangely like a seed observed in the gullets of very young Rosy Finches a few days later and referred to more directly below. The usual path of the bird was, however, a six inch strip at the very edge of the snow. Vegetation or heather farther back did not seem to interest it. There the twigs released from a perfectly prone position of winter captivity by the melting snow presently spring up or slowly rise, according to kind and elasticity of plant, and instead of the smooth path by the snow edge, they produce a tangle a few inches farther back through which the bird could not easily walk as it does, Lark-like. While watching one thus foraging, I was surprised to see her hop, Robin fashion, out over the snow, alternating this with an attempt to walk across the soft granular crystals. Rapidly she struck right and left with her beak at what I supposed were benumbed insects. Going out to investigate, tiny winged plant lice were found, here and there, and now and then

a gnat-like dipterous insect appeared. The Rosy Finch is very quiet when foraging and always searching, searching! Even in rainy, fog-dripping weather they still glean, pausing occasionally to shake their feathers free from gathered moisture.

While this snow-edge habit seems to be commonly employed at this season at snow line, it is not the only method used in searching food at the time of nesting. During the week of July 18–25, 1925, while camped on Jack Creek, opportunity was given to observe female Hepburn's Rosy Finch gleaning in a rather dry situation in the Pass between Mount Stuart and Ingalls Peak at an elevation of about 6500. At this time when making observations in this divide, while still on the Jack Creek side, I heard the familiar call of the Rosy Finch and saw two birds circle about and finally perch on the top of a subalpine fir (*Abies lasiocarpa*). After a few moments of inspection they flew directly to the ground and began walking very briskly about, crouching low and gleaning. One was observed picking seeds from the seed-crown of *Spraguea multiceps*. On the Ingalls Creek side of the pass three Hepburn's Rosy Finches were observed, at intervals during the afternoon, gathering from a patch of ripe spring beauty (*Claytonia lanceolata*) now holding heads filled with an abundance of shiny black seeds. On each arrival they approached the ground as described for the Jack Creek side of the pass.

Finally our long vigil was to be rewarded, this time by finding an occupied nest within fairly easy and safe reach. On the morning of July 9, Moore reported having twice seen Rosy Finches passing from the feeding grounds to a big outcropping head, almost the last one in the upper center of the glacier. With the aid of the binoculars he had distinctly seen a female Finch come from a crack in the slab rock which made up the crown of this dome. Together we went over the intervening snow field and as we approached the cliff we distinctly saw a bird enter the recess under observation. Shortly it emerged and flew directly over to the feeding grounds of the east moraine. While Moore was climbing the rock toward the nest, which was accessible from above, a bird returned and entered and did not reappear. After several minutes, when he approached, the bird darted out. Again very young fledglings were found in the nest.

As rapidly as possible we arranged to photograph the nest and young which could not be done *in situ* for they were arms length in the crevice and a tripod could not be placed. This difficulty was overcome by a bold expedient of carrying the nest bodily to a focal area in front of the camera and returning it at once after the exposures were made. Almost immediately the mother bird returned and flew into the rock cleft even before we had the camera removed from the vicinity. Later Moore went down to the snow field and watched with the binoculars, reporting the return of the

female to the nest cavity from which she did not emerge for the next half hour that he remained. She was evidently brooding the young, as it was now about 4 P. M. Subsequent development showed very satisfactory negatives from these exposures.

The Nest.—This was a bulky affair a little smaller than that of a Robin. It was constructed on the outside with considerable black, dead *Usnea* or tree moss (a lichen) and what seemed to be rootlets of what might be partridge-foot (*Lutkea pectinata*) which was to be found projecting down from the undercut sod of the moraine's knife edge. Quantities of rootlets, possibly of a sedge (*Carex*), rushes (*Juncus*) or a bent grass (*Agrostis*) were found although these fragments were difficult to determine. A few bits of old dead moss stems were also present in the outer wall. The lining was of grass culms which had the appearance of having been shredded to a considerable fineness in the bottom of the nest. Several Ptarmigan feathers were present in the lining.

The location of the nest was unlike that of the others, being in the slab formation, but this choice of habitat may have been due to the late season and very deep snow which almost covered the rhyolite domes.

The Young.—These young Rosy Finches, which may have been about three days old were decidedly flesh-colored with large, dark, closed eyes and bright yellow-rimmed mouths. They were clothed with a very light gray down, toyed by the gentlest of air currents, giving them a whitish appearance. Their legs were rather unusually long, the tarsi and toes flesh-colored. They uttered no sound. A very astonishing thing observed about them was that their gullets, full lengths of their necks, were quite full of seeds which showed plainly through their transparent skins. Of these there seemed to be two kinds, some brownish or blackish, similar to those now being found in the silt deposits of the snow edges both on July 6 and 12 mentioned above, and later determined as the seeds of the huckleberry (*Vaccinium deliciosum*) of the previous year's crop, and a second kind, a whitish or yellowish seed, probably a violet (*Viola palustris*) found fruiting on the moraine heath at the present date.

The nest was revisited on the 13th of July. We were greatly pleased, for we had no more than arrived than we saw a bird dart out from the nest cavity. At once our fears were set at rest as to the response of the birds to the rough treatment of our photographic efforts of four days previous. Pleased beyond expression, for they were not only there but had reconstructed the nest with the addition of more lining in the form of Ptarmigan feathers, a little *Usnea* and quite a lot of cascade mountain goat hair (*Oreamnos americanus americanus*).

We now remained in the vicinity of the nest for the first three hours of the afternoon during which time the parent birds did not return to their young

more than three or four times. Both male and female were attending the brood. Twice the mother spent half an hour at a time apparently brooding the little ones. She was silent when about the nest locality. The male on the other hand was very twittery when near the nest, using the jubilant notes heard in late spring in Pullman. Both parents seemed surprisingly indifferent to our presence, scarcely uttering protest at all.

The interval of four days had shown a remarkable change in the young. They were now found to have grown considerably in size, and especially in the development of wing feathers. The eyes were still shut, and it was estimated that at the present rate of development they would be able to leave the nest in another ten days. But it was to be another twelve months before we should see Rosy Finches again.

Observations of 1934.—Mount Baker had an early season in 1934. By the middle of June, the snow was quite gone around the old Schreiber cabin, where in 1933 at the same date the building was all but completely covered. We were easily able to take our horses the entire distance to our old location of 1929 where we established camp on the 16th of June. Moore had visited the Glacier as early as June 2d and observed at least four Hepburn's Rosy Finches. These birds were showing signs of the approach of the nesting season even at that date. As to the duration of the stay of Hepburn's Rosy Finch in its summer home on Mount Baker, it is interesting to know that Josephine Gordon, reported seeing two of these birds, in winter plumage, upon the Mountain, at an elevation of 3000 feet, on November 25 of this same year.

On the afternoon of the sixteenth Moore made a preliminary trip over the glacier returning to say that he had observed a pair of Hepburn's Rosy Finches remaining rather consistently about an outcropping in the upper center of the glacier, which had been practically buried with snow and ice the year before. This same evening two Rosy Finches were observed gleaning along the immediate edge of the melting snow of the west moraine of the glacier where quite a variety of flowers was already in bloom.

On the morning of the seventeenth we both set out, expecting to spend the day upon the glacier. Moore was to go directly to the central locality where he had seen the Rosy Finches the evening before, I to follow the west rim-rock. My progress had taken me down the outcropping about two-thirds of the way when I heard a distant call from the center of the glacier. Hastening in the direction of the sound I soon saw Moore coming across the snow field.

"Well, I found it! A nest with five eggs."

This was about 9:30 in the morning. While Moore returned to camp for more photographic equipment I went over to the locality he had described and sat in a warm sunny nook of the outcropping, awaiting his return.

The situation resembled very closely, both in geological formation and in position on the glacier, the habitat of the 1933 nest. Both outcroopings were dome-shaped, of hard, slab-flaked rhyolite formation rather than the pumice-like walls of gas-formed cavities also of rhyolite, where were found the nests of 1929 and 1932. To the west of the nest site not more than 25 or 30 yards was an outcropping of the old glacier ice itself. Far over to the southwest lay the reddish sierras of the Sisters. As guardians from the rear stood Arctic Baker and the rugged crags of the Black Buttes, themselves probably the last jagged remains of the wall of a huge crater. Arctic indeed was this landscape, yet inviting on this sunny day in June. Now and then a lone insect passed by,—a bumble bee lined over the rocks and flew with characteristic directness of flight; perhaps the fairy bells of *Vaccinium* awaited his clumsy investigations in a more congenial garden of the moraine. Now an idle butterfly flitted about my little rock cove seemingly to enjoy the warmth of the rock walls,—for here no trace of flower or vegetation existed! Presently a solitary syrphid fly lit upon my hand, confident in its wasp-like mimicry. And all this time there was no sign of the Finches.

Shortly, Moore returning, led the way, and now from a little porchway opening from beneath a large boulder lodged among its fellows and almost buried in silt, flitted a small brownish bird. She seemed not panic-stricken but rather quietly insistent upon her right to return to her own. The male appeared occasionally during the hours we spent there, but apparently it was the female who was doing the incubating.

The nest was well concealed, back about 12 or 14 inches from the opening leading to it and quite impossible to photograph *in situ.*

After careful consideration during lunch hour, we finally decided to focus upon a given spot, upon which the eggs were to be placed. This was done and within a very brief space of time the eggs were returned, and almost at once the mother entered the cavity where lay her nest and did not return! After giving her an interval of half an hour the entire nest itself was placed in front of the camera and five exposures made in prompt succession. Again the nest was returned to its site, and again, very promptly, the mother bird entered her door and did not come forth! Even by this date, the 17th of June she was sitting very closely.

The Nest.—In shape the nest was Robin-like, the rim of its cup being about 2½ inches in diameter. The coarse outer margin of the 1934 nest, as well shown in the figure was made almost purely of a lichen, of the genus *Usnea,* so common in the humid forests of Western North America. This plant commonly called "gray moss," hangs pendant from the branches of conifers and other trees and upon dying turns from greenish gray to black. When moist it is very flexible and becomes hard and binding when inter-

woven as in a nest rim. It may have been taken from the branches of fir trees or picked from the surface of the snow, where it had fallen in small pieces. In addition there were a few plant rootlets, probably taken from the under-cut knife edge of the lateral moraine or from pieces of sod dislodged from this position. Most of these were difficult of determination but in addition a few stems and heads of a rush (*Juncus*) were found. A few scattering tufts of a true moss were recognized as was also an occasional culm of the wood rush (*Luzula*). The nest cup was very neatly woven, thickly and firmly with the yellowish culms of dead, last year's bent-grass (*Agrostis humilis*)[1] the coarser stems making up the upper rim, the frayed, fragile paniculate tips woven into the cup and bottom, which extended through to the sub-stratum. No leaves or blades of rush, sedge, or grass were used, only culms. Adding to the local interest of this nest were a few Ptarmigan feathers, doubtless from three known pairs of these birds nesting on the moraines. As a further touch of local patronage was the ultimate lining of wild goat hair, which is visible in the illustration and which could easily be gathered from low bushes on the moraine slopes, left there by a local herd of these mountain mammals occasionally seen from our camp.

This nest would seem quite typical, although the rim of the nest of 1933, had noticeably more rootlets mixed with *Usnea*. All three nests examined, namely the new 1933 and 1934 nests and the old one of 1932 had much in common. In the lining of each appeared the culms of bent-grass. Each had a few feathers of the Ptarmigan (in the case of the 1934 nest seven were found). The 1933 and 1934 nests had a noticeable lining of wild goat hair, which however was not found in the ruins of the old 1932 nest. In the bottom of the 1933 nest were found the puparia of a Dipterous insect, probably a blowfly. These puparia were also found in the old 1932 nest but not in that of 1934.

The Eggs.—The eggs were white, glistening like good porcelain. Their contents showed pinkish in the sun and at the round end was an opaque area, formed by the air space. In shape they were formed like an old-fashioned, wooden spinning top,—very oval at one end and nicely pointed at the other. In size one egg carefully studied measured 22 x 16 millimeters. There were five of them.

Subsequent Data.—We had fond hopes of securing further data. Day after day the gentle bird persisted in her incubation. On the 18th, ice froze at our camp,—the 19th sleet fell upon the old snow at the nesting site. The 21st was a day of heavy fog and rain; turning to snow at camp and

[1] This determination was kindly made for me by Mr. and Mrs. Carl S. English Jr. whose botanical work upon Mount Baker and other areas of the Northwest is well known. The joint authorship of Mrs. English and Dr. Harold St. John has resulted in a publication entitled "Flora of Mount Baker." 1929.

continuing as such during the following night, the 22d it snowed until noon with intermittent sleet and hail during the afternoon. Then came a clearing day on June 23 with occasional snow flurries, producing a fresh fall of 2½ inches on the old snow at the altitude of the nest. June 24 and 25 were sparkling days of high-riding, billowy clouds and bluest of skies followed by two days more of storm in which rain was the precipitation. These were the incubation and brooding days of the Rosy Finch, secure in her rock-sheltered retreat.

Finding the Young Hepburn's Rosy Finches.—The eggs had been discovered on the 17th of June. On the 23d only eggs were present. The morning of June 25 four young and an unhatched egg were found. Again the nest was removed after a spot had been focused upon. Here were four helpless mites, slightly younger than our finds of 1933. Tender skin was noticed, irregularly tufted with fluffy gray down, which moved in the breeze. Large, dark, closed eyes,—yellow-rimmed mouths, thin, wobbly necks through which pulsed spurts of warm blood from strong heart to brain, all showing most vividly when the birds were brought from their hidden retreat to open daylight. No sound was uttered. Every effort was made by the fledglings to hide the eyes from the light. One white egg remained. A few days later one of the discarded egg shells was found about fifty yards below on the snow field where it had doubtless been dropped by the parent bird. It comprised about half of the shell, representing the pointed end of the egg.

The Young at Six Days Old.—On June 30 the Rosy Finch nest was again visited. The young now weighed 56 grams for the four of them, or 14 grams apiece. They still retained the gray downy plumage of hatching; but now had in addition, blackish pterylae of pin-feathers and stubby wing and tail quills. The eyes of one or two of them were just faintly opening and they had tiny far-away voices, rarely used, at long intervals. Their general color was noticeably darker. As in the case of the nestlings observed in 1933, their gullets were now distended with seeds both dark and light, the light predominating. A slight disturbance would cause them to reach eagerly for food, stretching their slim necks to their fullest extent and opening their mouths widely.

The Young at Nine Days Old.—On July 3, 1934, when the young were 9 days old the nesting site was again visited and the occupants weighed and photographed. At this date they had advanced markedly and weighed 84 grams, or an average of 21 grams apiece. They were now showing distinct signs of intelligent, awakening interest. Hunger seemed to be a rather constant stimulus. Baby down was now giving way to rather coarser resistant feathers. Eyes were all open, as also were gaping yellow-rimmed mouths on slightest provocation. They had grown remarkably and were now indeed a nest full.

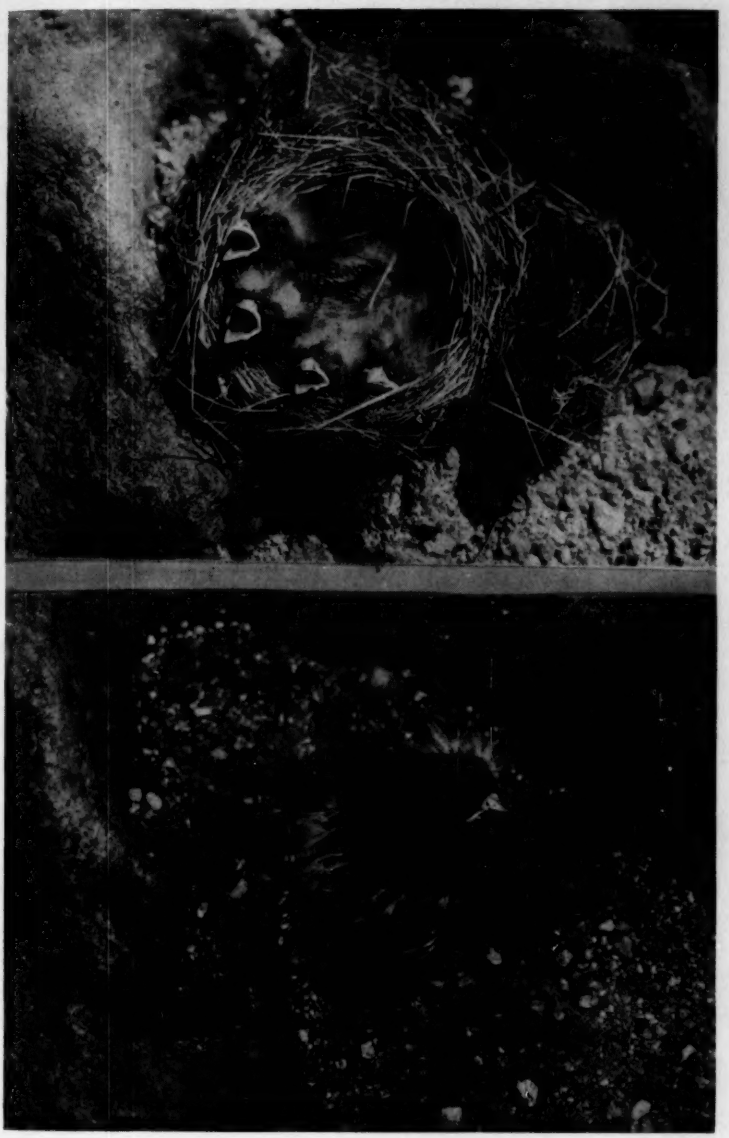
The nest itself which was brought out of its retreat each time photographs were taken, was still holding well to its original shape and had none of the overtrodden, flattened shape of abandonment such as was shown on July 8, 1934, when it was being deserted.

The Young Hepburn's Rosy Finches at Fourteen Days Old.—July 8, 1934, was a day of rain and drifting fog. All forenoon we remained in camp, but the fear that the young Finches, now 14 days old, might leave the nest for good induced us to make the trip over the glacier which by now was beginning to lose much of its last-winter's snow, and to show crevasses here and there. Drifting fog and rain accompanied us; but our unusual effort was to be abundantly rewarded, for already two of the four fledglings had flown. Our last picture of the series was now possible; the final weight of a nestling was to be taken. The following day no birds, young or old remained. The Rosy Finches had abandoned their glacier nesting places for the more congenial and fruitful foraging sites beside the moist edges of the retreating snow banks of the flower-clothed moraines.

The little birds were now a study in brown, in bristling quills for future flight efforts; but still retained tiny seams of nestling down, to be tossed gently back and forth by drifting fog as yet no sign of the gray of the adult head had begun to show. One of the remaining two little Finches weighed 26 grams on this the 14th day of its life and its last day before leaving the home nest.

The Incubation Period.—This can only be inferred. It was noted that one egg, the one which did not hatch, had a slight stellar fracture on one side, on the day the eggs were discovered. This probably arrested development. On subsequent investigation, an embryo of about 5 or 6 days growth or incubation was found. The body, head, eyes and beak were all well formed, while both yolk and white in quantity remained. This evidence, together with the 9 known days of incubation would place this period at about 14 days.

This is the story of our search; these the records of our findings. It was indeed a quest full of alluring obscurities and challenges to one's better self. In all our immediate studies, acknowledgedly still incomplete, of this wonderful bird on Mount Baker, we took no life, save the possibility of that attendant upon the cracked egg, which may have been due, unintentionally, to our gross manipulation. Long may the Hepburn's Rosy Finch enjoy her Arctic-Alpine fastness for we feel as Dawson felt with his Sierra Rosy Finch (*Leucosticte tephrocotis dawsoni*) "If lofty association means anything for character, also, the Sierra Nevada Rosy Finch ought to be the very best of birds, for it is his privilege to spend a life time wrestling with the eternal snows." (Birds of California, p. 158). Long may the crags of Baker remain a peaceful sanctuary, in pleasant view of the one-time home and now the last resting place of James Hepburn, pioneer naturalist, for whom this bird,



Photos by Wm. T. Shaw.

UPPER: YOUNG HEPBURN'S ROSY FINCH, NINE DAYS OLD, JULY 3, 1934.
LOWER: FLEDGLING AT TIME OF LEAVING NEST. JULY 8, 1934.

UNIV. OF MICH.

Hepburn's Rosy Finch, was named,—a retreat safe, let us hope, from those who might be tempted to seek out the glories of her habitat to do her harm.

Fresno State College, Fresno, California.

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THE FORMENKREIS-THEORY.

BY PROF. ERWIN STRESEMANN.

*Zoological Museum, University of Berlin.**

THE Formenkreis theory is believed by many to be a German invention, of whose essence and significance many systematists have not yet received a clear impression. One point, particularly, has not yet become clear to them, i.e. whether there is a difference between the species conception of the modern systematist and the Formenkreis theory and, if such exists, what that difference is. Many people are of the opinion that the origin of the Formenkreis theory is closely connected with the use of trinomial nomenclature. In this connection it might be of value to give a short historical review.

Very soon after Linné had introduced the binary naming of living organisms, the opinion was emphatically expressed that not all the forms separated in that manner were of equal value. The great philosopher, Kant, in the course of his lectures on physical geography given in 1775 points out that we must discriminate between *natural description* and *natural history*. He calls the first the *artificial* system by division into classes which are arranged according to resemblance, and calls the latter the *natural* system by division into tribes which are arranged according to the relationship of the animals. He speaks, for example, of the squirrel, which is brown in Germany, but becomes gray in Siberia, and of birds of the same species which vary in color in different climates. Some years afterwards, in 1791, another German, Esper, in a treatise on varieties, points to the fact that there are some genera which contain so many and so closely related species, that it would be advisable to subdivide them. Some of the varieties, he goes on to say, are characterized by essential characters, and he proposes to call them subspecies. That these subspecies have been derived from the species is shown, according to Esper, by the perfect similarity of the essential characters.

George Cuvier, in 1798, tried to give a definition of a species and what he calls varieties, in the following paragraph:

> "If the descendants of some organisms have more or less deviated from the appearance of their ancestors, one says they have varied. It has been observed that the most variable characters of organisms are size and color. The first depends mainly on the quantity of food, the latter on the influence of light and other causes so obscure that color often seems to

* An address delivered before the Naturalists' Forum of the Academy of Natural Sciences of Philadelphia on January 28, 1936.

differ only by the action of chance. However, the variation of both these characters has certain limits, which can be determined by observation. To accept two creatures, which differ more or less, as being only varieties of one species, it is necessary firstly that the distinguishing characters belong to those which are known to vary; secondly that there should be cause for variation; and thirdly that they should produce fertile offspring when crossed. Therefore two wild forms which live at the same place in the same climate, without interbreeding, and always maintain their differences, have to be regarded as different species, no matter how trifling the difference might be."

This sounds like a very modern definition, although it dates back to the end of the 18th century. This is followed by a period, during which the use of the term variety to characterize slight deviations from some other type, already named, became gradually discarded, although authors continued to distinguish by binomials a score of forms which only differed in small degree. As a reason for this practice, followed until quite recently in many branches of zoology, Friedrich Boie in 1831 gives the following: "It is not advisable to subordinate living beings under other species, if they differ from the latter by constant characters recurring in subsequent generations, for, it seems highly probable that there exist merely genera, in which all species merge into each other by such imperceptible gradations, that there can be no longer any question of subordination. A variation traceable through generations should be ranked as a full species, unless it can be shown that such variation returns to the original form from which it appears to have deviated."

This view very soon met with strong opposition on the part of other German ornithologists. Friedrich Faber was one of the foremost. In 1825 he claimed that the different species, created by Nature from the very beginning, would vary in shape and color when extending their range of distribution, under the influence of a new environment. These were the variations or races, which some of his contemporaries were inclined to treat as separate species. He continues: "If we accepted all these local variations as distinct species, no natural system would finally be able to hold them, no ornithologist to put them in order, no memory to retain them. Research into the laws of geographical distribution of birds would become blocked at its source, and the foundations of science itself would be shaken." This met with approval from many ornithologists, such as Bruch, Naumann and others. In 1833 a book wholly devoted to this subject appeared, written by Constantine Gloger under the title "Das Abändern der Vögel durch Einfluss des Klimas" (The Variation of birds under climatic influence). Here Gloger tries to draw a sharp line between true species and climatic varieties; in his opinion, the latter did not deserve to be named at all, or,

if they were, they should be expressly marked as such. To invent, however, the simplest method of doing so was left to Hermann Schlegel. In his treatise "Kritische Uebersicht der europäischen Vögel," published at Leiden in 1844, he first applied trinomials in the way we do now by simply adding the subspecific name to the name of the species. This was in his day quite a revolutionary procedure; one had become accustomed to look upon Linné's binomial nomenclature as a scientific principle not to be disturbed, and very few people therefore dared to follow Schlegel.

Schlegel's trinomial nomenclature had first to win approval in America before it found any acceptance among Old World ornithologists. John Cassin, in 1854, was the first American who endeavoured to adopt this novelty; but its chief promoter in this country was Spencer Fullerton Baird, who, from 1858 onwards, made use of trinomials on a large scale, although, by intercalating the term "var.", in a somewhat "milder" form. He soon acquired quite a number of followers, and when, in 1886, the American Ornithologists' Union laid down their "Rules for Zoological Nomenclature," the use of trinomials was recommended by the Committee. Henceforward, trinomialism was regarded in Europe as being an American innovation, which in the beginning was looked upon with suspicion, and furiously attacked, as soon as it was noticed that some Old World authors began to introduce it in their writings (as Sewertzow in 1876, Count Berlepsch in 1881, Seebohm in 1885 and Ernst Hartert in 1887). But all the hostility of the Old School has not succeeded in blocking the reform, and the last defenders of binomials are trying to hold a fort which was practically surrendered some time ago.

So finally the moment seemed to have arrived when both contending parties, the Synthetisists and the Analytists among bird students, would shake hands, having been reconciled by the adoption of a new method. But soon it became apparent that the reconciliation was only a formal one, and that there was great diversity of opinion regarding the essence of this new method. Faber and Gloger accepted the theory that there was but one certainty, namely the external integrity of the species, this being, so to say, the axis, round which the varieties of the same species would whirl in perpetual movement; if one let go this axis, even the spectator would grow dizzy —to quote the instructive expression of Gloger.

But after the appearance of Darwin's book on the Origin of Species, in 1859, this view gave place to a very different one. For Darwin and his adherents there existed no other difference between species and varieties than the fact, that the varieties are known or believed still to be connected by intermediate linking forms, whereas the species were formerly connected with each other in this way. There seemed, therefore, no longer any reason for accepting the sharp boundary line drawn by Pre-Darwinists to separate

the species, and therefore only one criterion for the determination of species and subspecies seemed to hold good: the degree of morphological difference. This had clearly been recommended by Darwin himself, when he wrote: "two forms, if differing very little, are generally ranked as varieties, notwithstanding that intermediate linking forms have not been discovered. The amount of difference considered necessary to give to forms the rank of species is quite indefinite." Taxonomists, as far as they decided to adopt the introduction of subspecies, now began to look at the whole question as being simply a technical one, as being a matter of convention and not one of scientific principle. Joel Asaph Allen, in 1871, was the first to propose, that intergradation should be regarded as the touchstone of trinomialism. Owing to Allen's high influence among vertebrate zoologists in this country, this suggestion met general approval in America; but the method very soon degenerated, because it became handled with orthodoxy and red tape. Those who claimed to belong to Allen's truest followers, gave every form the rank of a full species unless intergradation with another one was fully proved, slight as the differential characters might be. All island forms, for example, were on principle treated as species, because intergrading was out of question in cases of complete isolation of a given community.

In Germany, the Darwinian influence led ornithologists in quite another blind alley. During the last twenty years of the 19th century, the leading German ornithologists agreed to regard the degree of differentiation as being the only test to decide the question. In 1891, the German Ornithologists' Union (Deutsche Ornith. Gesellschaft) accepted the following paragraph among the rules of zoological nomenclature: "If given local forms differ from each other only in such a slight degree by color, or by size or shape, that any diagnosis would be of no use for determination unless direct comparison were possible or unless one knew the locality, such local forms should not be treated bionomially as species, but should be marked as subspecies by attaching a third name to the name of the species, from which the subspecies has branched off." The application of this rule soon turned good into bad. German ornithologists started to treat all very similar looking forms as subspecies, for example the European Willow Tit became a subspecies of the European Marsh Tit, *Certhia brachydactyla* became a subspecies of *Certhia familiaris;* and, on the other hand, one single striking difference in coloration was regarded as sufficient to treat two forms, otherwise quite alike and even interbreeding at the borders of their range, as full species; for instance the Carrion Crow and the Hooded Crow, or the British and the Continental White Wagtails. Gloger's chains of connected forms thus became dismembered again, and their parts were thrown pell-mell. The confusion had reached a new climax.

Such was the state of affairs when in 1897 Otto Kleinschmidt, after

thorough taxonomic studies, went on to demonstrate the failure of the method then in vogue. By examining the variation that exists in the Marsh Tits and the Crested Larks he had discovered the existence of two very similar species, living side by side in a considerable part of their range and showing some parallelism in their geographic variation. Kleinschmidt then had gone through the literature and thereby revealed the fact, that Christian Ludwig Brehm, one of the Pre-Darwinists, already had disentangled the matter in a very able way, and that it had been their interpretation of Darwin's doctrine which had led the next generation to mix things up again. It is this experience which started Kleinschmidt's passionate opposition against Darwinism. The more deeply he went into the matter of geographic variation of animals, of birds and butterflies, the more intense became his belief that there was no proof at all to support the Darwinian ideas. On the contrary it seemed to Kleinschmidt that every species always remained separated from all other species by a gap, if one tried to follow the descent as far back as paleontological testimony allows, and therefore he turned back to the view that every species had its own independent origin. According to Kleinschmidt, species are undergoing a certain, in some cases a very considerable amount of geographic variation, but none of these geographic races can ever be regarded as incipient species. It is the task of the taxonomist to discover the limits of the true natural species by tracing all the geographical races into which they have split. In order to distinguish by name these so-called "natural species" from the species of the Darwinian school, Kleinschmidt introduced the term "*Formenkreis*," but there is not the slightest difference between his "formenkreis" and the "species" of Gloger and certain other Pre-Darwinists.

Let me quote his own words, from the English translation of his textbook which appeared in 1930 under the title: "The Formenkreis Theory and the Progress of the Organic World." "The Formenkreis Theory upholds the indications found in Nature as to independent sources of life; on the other hand the limits of each independent group are widened to an inconceivable extent. If the question is asked: May there not be a relationship between root and root? I would reply: Yes! If it is granted that this is quite a different kind of relationship than between two leaves springing from the same root, and in the same way that one can detect a relationship between drops of water falling in succession from two adjoining spots, or even from a single spot of the same rain soaked roof.

"There was a time which, on account of its temperature and chemical conditions, was favorable for the origin of organisms upon the earth. So long as this period lasted, the foundations of the Formenkreises continued to come into existence and the Formenkreises themselves continued to arise through differentiation. That such a period existed, as well as further

progress of life, is the work of the Creator. Theology consequently has no desire to borrow from science in order to explain the origin of life.

"Some of the Formenkreises developed rapidly and then became rigid (Lingula). Some of them took to growing slowly and reached a higher development. Many spread as far as their organization permitted, over the greater divisions of the earth or seas, some being cosmopolitan with few races, others residents with many races.

"Our aim is no longer systematic arrangement (as a demonstration of the degree of morphological differences), but research on origin and descent (that is to say, the active process of growth). The common origin gives the Formenkreis a concrete existence, whereas it would be a mere abstraction as a product of Taxonomy. To put it quite shortly: The novelty of the Formenkreis Theory is its extension beyond the idea of groups of subtle forms, to the investigation of questions of relationship and origin and the connection between taxonomy and the theory of descent.

"It is no longer the varying degree of difference which marks the distinction between species and a race, but the plain answer to the question, whether there is geographical replacement and exclusion or not.

"Not only subtle forms, which are very similar to each other or which are connected by intergradation, but also good species of the old taxonomy, in spite of striking external dissimilarity or considerable gaps in their continuity, will be included in the same Formenkreis."

Kleinschmidt summarizes "Each Formenkreis has probably an independent center of origin, an independent period or origin, and an independent progress accompanied with an independent rate of development, or in a word, an independent existence."

During forty years of research work, Kleinschmidt has not materially changed his ideas. Let us now consider his influence on the development of taxonomy.

This influence can hardly be overestimated. The present day use of Trinomialism, not only in ornithology, but in many other branches of zoology too, is mainly based on Kleinschmidt's views. Ornithologists became more and more accustomed to the idea that there was really something like natural species, surrounded by sharp structural boundaries; and even though many of them soon became aware of the fact that the essence of the Formenkreis theory would not bear every test, most of them handled the matter *as if* they believed in natural species, by including more and more geographical representatives in one species compound. To use a metaphor: present days taxonomy can be compared with one of the Indian Banyans. As long as they are young, they need the support of some strong rigid tree, but by and by they develop innumerable roots of their own round this center, and at the end the supporting tree is suffocated, and what remains

is a majestic *Ficus* tree, standing at the place of its former host and even mistaken for it by the casual observer. Most scientists who now use the practice proposed by Kleinschmidt are Darwinists. They call the species by the name of Formenkreis, not because they believe in the independence of species, but because it proved to be advantageous to adopt such a fiction.

In how far is this advantageous? How can it be that a scheme works all right which is based on an erroneous supposition? I believe the reason for this to be the fact that most of the present day species are much older units than one had formerly accepted, and that it is practically never the individual variation occurring *within* a population which gives rise to speciation. On the contrary, species usually multiply only on the basis of geographic variation, and this is a very slow process. One of our critical tests of taxonomy, in fact the only one which can be adopted for practical use, is furnished by geographical distribution.

We are used to call two similar forms subspecies of one species, if they replace each other in space; and we call them different species whenever they live in the same area without interbreeding. But by doing this we shall always have to remember, that this is only one way to treat the matter, one of great convenience to the zoogeographer and the ecologist, but it is nevertheless an *artificial* system, not at all doing justice to the degree of differentiation. It is pretty certain that many geographic representatives at present regarded as subspecies would behave like so-called "true species" if nature gave them a chance of settling in the same area. In a few instances we get a surprising proof of this. It most frequently occurs with island birds. Every taxonomer will know, from his own experience, some instances of two closely allied and vicarious forms meeting again somewhere and living there together without interbreeding. I may mention here the puzzling *Collocalia* group, or the Kingfishers of Micronesia and Melanesia. Nobody had the slightest doubt that *Parus major* and *Parus minor* were strictly representing each other, until both were found to inhabit together a large area in the Amur land. There are other and even more puzzling cases. The English Sparrow *Parus domesticus* and the Mediterranean Willow Sparrow, *Passer hispaniolensis*, live side by side in Spain, in Greece, in Asia Minor and in Palestine, somewhat differing in ecology. Here they never interbreed and everybody would treat them as species. But if we proceed to Northern Africa, we will meet there a mixed population, practically composed of hybrids only. Here they behave exactly like two members of one species. What to do with them?

These are not the only facts, which drive the Formenkreis Theory into a corner. Take the following. It is a pretty well grounded assumption that subspecies of one species will differ only to a slight degree or not at all with regard to life history, as opposed to what distinguishes true species. Ecology,

therefore, has become an important help in taxonomy. But how to handle cases like this: In Melanesia you will find a Thrush of the group *Turdus papuensis* living in the alpine grass-plains of the high mountains of some of the Solomon Islands. Here this bird is a very typical highland bird, never coming down to the lowlands. By proceeding towards the East, you will get to flat islands only, and here practically the same bird lives at sea level, under extremely different climatic conditions. Or examine the bird fauna of New Guinea. In the high mountains of this island, you will encounter several birds very closely related to lowland forms of the same district, yet constantly differing, mostly by larger size, but also in some other respects. Intermediates do not occur. Shall these mountain forms be treated as subspecies of the lowland species, or do they merit the rank of a full species? That is just a matter of taste. In these cases, at least, lowland and highland forms do not differ any more from each other, or they differ even less, than horizontal representatives often do.

Should we, in view of shortcomings like that, discard altogether the scheme to which the Formenkreis Theory once had encouraged taxonomy? I think that would be a deplorable mistake.

We shall always have to take into consideration that life never can be forced into a rigid system; but of all systems ever proposed the present day use of trinomials is the least evil, in spite of some deficiencies. To return, for safety's sake, to some more cautious use of trinomials would be a decided backstep. May I quote, in justification of our present-day procedure, once more Constantin Gloger, who, 100 years ago, wrote the following sentence: "It is only by connecting the facts that we shall be led to the principal laws, but not by splitting and dismembering. The splitter separates homogeneous and corresponding facts, and throws them separately upon the unarranged heap, where they will escape the attention of Science which tries to arrange them in a true and natural order; and so they will remain in disorder, having lost all their meaning with regard to the whole and being placed themselves in a wrong light."

Whoever uses trinomials in a modern way, will have to be gifted not only with knowledge, but also with tact and last but not least with *moderation.* It is sometimes more misleading than helpful to rank very widely differentiated forms as subspecies, only on account of obvious affinity to some geographic representative. No fast line can be drawn here. But one ought to refrain from red tape. Whoever wants to hold to firm rules, should give up taxonomical work. Nature is much too disorderly for such a man. He better would turn to collecting postage stamps.

May I draw your attention, in conclusion, to the nomenclatural scheme introduced some years ago by Bernhard Rensch. He proposed to discard the term Formenkreis, unless one believed in independent species. The

more or less large racial compounds of modern ornithology he calls a *Rassenkreis* or a Circle of Races, and if one group of geographic representatives can be subdivided into two or more sharply defined minor groups, he proposes *not* to rank them all together as subspecies of one species, but to break up the compound into several Rassenkreises or Circles of Races, which represent each other geographically and apparently are of common origin, forming what Rensch calls an *Artenkreis* or Circle of Species. It is not the task of *nomenclature* to express all systematic judgment, it must suffice that it expresses the *essential* part of it, and we should always be careful not to overdo. Trinomialism cannot express our view as to which Circles of Races constitute a Circle of Species. We should gladly leave this to the monographer of the genus who can do this in his tables.

It is one, and perhaps the chief, aim of present day nomenclature to support our overburdened memory, and this will be attained by adopting large genera and large circles of races, both, however, without exaggeration.

Academy of Natural Sciences of Philadelphia.

January 16, 1936.

THE NUMBER OF CONTOUR FEATHERS IN PASSERIFORM AND RELATED BIRDS.

BY ALEXANDER WETMORE.

WHILE studies of the arrangement of the contour feathers of birds on the body (pterylosis) have been numerous only slight attention has been given to the total number of feathers comprising the plumage so far as I have been able to ascertain. Dr. Jonathan Dwight[1] found 3235 feathers on a male Bobolink taken in spring. R. C. McGregor[2] has recorded 1899 feathers on a Savannah Sparrow (presumably a western form) and 6544 on a Glaucous-winged Gull both enumerations being made from study skins. Miss Phoebe Knappen[3] has reported 11,903 feathers on an adult female Mallard obtained March 19, 1932 at Pohick, Virginia, the bird being one that had died from phosphorus poisoning. According to the legend on a cartoon in the 'American Magazine' for October, 1934, p. 86, "to settle an argument over the number of feathers on the average chicken, Vernon Thornburg, Barnesville, Ohio, dairy employee, killed and plucked a Plymouth Rock. He reported 8,325 feathers." The only other report of pertinence known to me is that of Dr. Percy Lowe[4] who records that in a young of the Gentoo Penguin (*Pygoscelis papua*) he found 300 feathers to the square inch. The total number for the bird was not given. No other notes on this subject have come to my attention.

Though the number of feathers that might compose the plumage of the average bird had been in mind as a subject worthy of thought for a number of years it was not until 1933 that opportunity came to make definite investigation. Through funds provided by a grant from the private income of the Smithsonian Institution it was possible then to carry out a series of studies that covered the period from the middle of February to the end of October with an intermission from the middle of July to the latter part of September when it was not practicable to secure birds that were not in molt. The actual labor of counting was done under my direct supervision by Marie Siebrecht (now Mrs. James Montroy) who, employed as an assistant, worked carefully and conscientiously at a long and somewhat tedious task. A brief report on this work was given before the A. O. U. meeting in New York City in the fall of 1933, and it was intended to continue the investigation. Various circumstances have prevented this and it seems desirable now to place the observations made on record.

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[1] The Sequence of Plumages and Moults of the Passerine Birds of New York. Ann. New York Acad. Sci., vol. 13, 1900, pp. 118–119.

[2] Condor, 1903, p. 17.

[3] Auk, 1932, p. 461.

[4] Proc. Zool. Soc. London, 1933, p. 487.

METHODS.

The work of counting feathers was carried on entirely with birds in the flesh. These were collected in Maryland and Virginia within a radius of eighty miles from the city of Washington under permits granted by the Game Commissions of these states, and were obtained in part through the assistance of Mr. Frederick C. Lincoln. I am indebted to Miss Phoebe Knappen for a number of birds killed by striking the Washington Monument during fall migration. The specimens, when study of the feathers had been completed, were made into skeletons, which are preserved for other investigations in the U. S. National Museum.

In the field the birds as taken were handled carefully to prevent injury or loss in plumage. At once they were examined for blood spots, the throat was plugged with cotton, and the bird was dropped into a paper cone for safe carrying in the method usual in collecting birds for specimens. Where loss of feathers occurred during this handling a record was made of the number on the paper cone. In warm weather I carried a small portable ice box in my auto in which the birds were placed soon after death. At home the specimens were kept until wanted in an electric refrigerator where they were held just above the freezing point. The latter is important since in small birds that have been frozen the skin often slips almost immediately after thawing, making them difficult to handle.

In the laboratory specimens were placed in a small ice box to keep cold when laid aside temporarily during noon hour or other interruptions. By careful attention it was thus possible to keep birds in proper condition for use for a week or ten days without particular difficulty.

In this study contour feathers alone have been considered, the downs and filoplumes being disregarded. The feathers were plucked a few at a time by means of fine tweezers and were counted in lots of one hundred, a check mark being made for each hundred. At any interruption in the work the number counted was set down at once to avoid error.

Account was made separately for the different feather areas under the headings of capital, dorsal, caudal (including rectrices), humeral, alar (including remiges), femoral, crural and ventral tracts, these figures being added to arrive at the total for each bird. The lines of division between the different feather tracts on the upper surface of the body were made arbitrarily as feather growth there in most species of birds is continuous so far as capital, dorsal and caudal tracts are concerned. A separate record sheet was made for each bird giving the record number, name, sex, locality where obtained, and date when collected. Necessarily there was some change in procedure as data accumulated and beginning with specimen number 53 record was made of the weight of the bird on the day that it was killed. It

was weighed again before plucking there being a slight loss from evaporation during refrigeration.

The feathers as counted were placed in a glass beaker on which there was a paper cover held in place by a rubber band. By means of a small hole cut in the paper top it was possible to confine the feathers and to ascertain the weight of the plumage. There was a regular difference between the weight of the bird before plucking and the weight after plucking plus the weight of the feathers due to a certain amount of dessication during the work. With ordinary small birds one specimen was counted each day, two being handled on a few occasions. The work was exacting so that more prolonged effort was liable, through fatigue, to lead to error.

DISCUSSION.

In beginning these studies it was the original intention to ascertain the total surface area of skin in each of the birds that was plucked in order to have some criterion for comparison between size and total number of feathers. It developed, however, that the surface area of an irregularly formed body like that of a bird could not be obtained with sufficient exactness to give the desired information.

To those accustomed to skinning birds it is at once evident that it is not practicable to remove the skin and measure it, since stretching or drying would change the size too materially. Consultation with Dr. C. G. Abbot, Secretary of the Smithsonian Institution, and Mr. L. B. Aldrich of the Astrophysical Observatory, and inquiry among other physicists failed to develop any method of measurement sufficiently accurate to give the necessary comparative data. One suggestion was to paste bits of thin cloth cut to fit over the body and then remove these and measure them, a method that was tried on two specimens. It developed, however, that there was a possible error here of two percent or more due to indentations in the body that could not be fitted, to drying of the patagial membranes, and to expansion and contraction of the cloth so that this procedure did not yield the desired information. Formulas that have been currently used in which the weight and certain measurements are the basis for computing the body area proved subject to even greater margin of error.

As a final resort the weight of the bird before plucking and the weight of the plumage removed were obtained by sensitive scales. The data secured are included in the accompanying table but are not considered particularly significant. They are given more for the interest attaching to the weight of the plumage than for any other reason.

With birds kept in the relatively dry air of an electric refrigerator there is a slight loss in weight due to dessication. Thus a Mourning Dove dropped from 152.7 grams to 152.4 grams in two days, a Nighthawk from 67.9 grams

to 66.8 grams in four days, a Hummingbird from 2.8 to 2.6 grams in two days, and a Long-billed Marsh Wren from 11.3 to 10.7 grams in six days. The weights given in the table are those recorded within a few hours of the time when the bird was killed.

There was also a regular loss from dessication during the time required to pluck the bird this being proportionate roughly to the size of the specimen. This amounted to .2 grams in the Mourning Dove mentioned, to 1.5 grams in the Nighthawk, to .1 gram in the Hummingbird, and to .4 grams in the long-billed marsh wren. The plumage was weighed immediately after it was plucked. The weight of the feathers varied somewhat with atmospheric conditions but this difference was relatively slight.

From the data at hand certain inferences may be drawn which are discussed in the following paragraphs. In considering these it must be born in mind that generalization is made from an amount of information that, while decidedly more than has been available previously, is still so small, when each species represented is considered, as to be in a measure tentative and so subject to change and revision.

The work of feather counting is tedious and exacting and yields small result relative to the labor involved. It gives information of interest and value however and it is hoped that others may carry on the work. In the present studies only the smaller birds have been considered, and those handled have come from a somewhat limited geographic area, though they have included northern migrants. It will be of interest to check these same species with records at distant points, to obtain counts for many additional species concerning which now nothing is known, to compare related subspecies, to compare like types of birds from different geographic areas of similar climate, to compare birds of similar type from temperate and tropical areas, and to follow some common species through the year making counts weekly or even more frequently.

INDIVIDUAL VARIATION.

In the series examined there does not appear to be any difference in number of feathers that may be correlated with sex. For example male and female of the Hermit Thrush taken on the same day had 1884 and 1873 feathers respectively, while male and female of the Chestnut-sided Warbler secured together had 1426 and 1396. It is probable that where there is marked difference in size as in some Hawks and Owls, or where there is considerable difference in plumage, as in the Birds of Paradise, that there may be a corresponding sexual variation in total feather count. In the limited data at hand where there is evident any difference it seems due to other factors than sex, as will be presently indicated.

The limits of individual variation, regardless of sex, among birds taken

at the same season are shown by a few examples. Two Downy Woodpeckers secured on February 12 had 2512 and 2584 feathers. Two Phoebes shot April 1 and 9 had 2083 and 2081 feathers in the plumage. The count for three Hermit Thrushes taken October 21 ranged from 1828 to 1884; for two Golden-crowned Kinglets secured October 14, 1268 and 1386; for three White-eyed Vireos secured September 29 from 1332 to 1542; for two Magnolia Warblers collected May 7 and 14, 1414 and 1493; for two Canada Warblers May 14 and 21, 1398 and 1473; for three Slate-colored Juncos March 26 to April 1, from 1961 to 2092; for three Field Sparrows April 16 and 23, from 1822 to 1849; for five White-throated Sparrows February 22 to March 19, from 2384 to 2710; for four Fox Sparrows February 26 to March 26, from 2482 to 2757; for six Song Sparrows March 5 to 19, from 2093 to 2335. The latter were taken especially to show what the range of individual variation might be. The range is more than had been anticipated.

SEASONAL VARIATION.

One of the interesting facts ascertained through these studies is that a definite seasonal variation in number of feathers is evident in all those species for which sufficient evidence is present.

The Goldfinch may be indicated in particular in this connection since it has differing plumages for winter and summer, the nuptial dress being acquired by a prenuptial molt that involves the body plumage but not the wings and tail. According to Dwight[1] the prenuptial molt is found in both sexes though less complete in the female. The data at hand apply mainly to females. Two of this sex obtained in February and March had 2107 and 2368 feathers, while one shot April 1 had 1901. These were all in winter plumage. A female secured June 25 in full breeding dress had only 1439 feathers. The difference is definite and considerable.

Similar seasonal differences are shown by birds in which there is little or no difference between winter and summer dress. Three Downy Woodpeckers taken from February 12 to 19 ranged from 2153 to 2584, one shot March 26 had dropped to 2020, and one taken April 20 to 2009. A Carolina Chickadee taken February 19 had 1704 feathers while in one secured June 4 there were 1140. A Black-and-White Warbler obtained April 9 had 1679 feathers and another secured May 7 had 1473. A Louisiana Water-Thrush shot April 18 had 2146 feathers while another taken June 4 had only 1525. Slate-colored Juncos taken from March 12 to April 1 ranged from 1961 to 2092, while one collected April 21 had 1886. A Chipping Sparrow on May 28 had 1511 feathers while two on July 9 had only 1150 and 1204. Field Sparrows in April ranged from 1822 to 1849, while one on July 9 had 1280

[1] Ann. New York Acad. Sci., vol. 13, October 19, 1900, h. 180.

feathers. Song Sparrows taken in March ranged from 2093 to 2335, while on July 2 a male had 1304.

It is evident from this that in the species studied from a maximum number of feathers found in the winter plumage there is a steady decline through early spring to a final low at the entrance of summer. The loss in feathers seemingly progresses steadily as cold weather passes and warmer weather advances. In other words birds have a natural adjustment in dress to the needs of the season, a sensible arrangement that while apparently hitherto unknown is one that might be expected. As the lessening number of feathers is accompanied by considerable wear in those that remain the amount of the body covering is very appreciably lessened. The final low ebb of summer culminates in the post-nuptial molt by which the plumage is renewed for another seasom.

While the greater part of the plumage is replaced immediately at the post-nuptial molt there is some adjustment to the needs of the bird through which the complete plumage may be acquired more slowly. While a Carolina Chickadee had 1704 feathers on February 19, two taken October 8 and 15 had only 1309 and 1256 respectively; a Ruby-crowned Kinglet on April 9 had 1560 feathers, while three taken October 11, 15 and 19 had 1119, 1326 and 1289; a male Chewink shot April 18 had 2235 feathers, while another on October 8 had 1816; a Chipping Sparrow on May 28 had 1511 and another on October 24, 1313; white-throated sparrows in February and March varied from 2384 to 2710, while two on October 4 and 8 had 1545 and 1508 respectively. There appears here to be some adjustment in these species whereby, while the bulk of the plumage is acquired at once following the summer molt, the complete, dense plumage that comforts the body in winter does not come until later, so that during the fall when the weather is relatively warm these birds are not burdened with too heavy a covering.

The forms just mentioned are among the hardier species which pass the winter season in areas where cold, for short periods at least, is considerable. In some species that migrate early and pass the winter in the tropics the complete body plumage seems to be acquired immediately following the summer molt. Thus, a White-eyed Vireo on May 21 had 1313 feathers, while three that struck the Washington monument on southward migration on September 29 numbered 1332, 1386 and 1542 respectively; the feathers of a Red-eyed Vireo on June 4 numbered 1510, while others secured September 18 and 29 counted 1784 and 1531; two Magnolia Warblers taken May 7 and 14 had 1414 and 1493 feathers, while one on September 18 had 1635; a Black-throated Blue Warbler on May 14 had 1527 feathers, while another on September 18 had 1620; a Yellow-breasted Chat on May 14 had 2001 feathers, and another on September 28 possessed 2113.

The difference between this group of species and the one described just

before is obvious. Further data on other families will be interesting. It appears that Vireos and Wood Warblers may be uniform in a speedy, complete renewal of the body plumage following the summer molt. The Myrtle Warbler may be an exception, as some individuals winter in regions of considerable cold. It would be interesting to compare the number of feathers in the latter with others taken at the same season in the West Indies.

VARIATION AMONG SPECIES.

Certain points of variation in number of feathers among the different species considered in this report are of interest as being indicative of what may be expected when more information is available. The bird with the smallest number as might be expected, is the smallest in the group, a Ruby-throated Hummingbird taken June 11 that had 940 feathers. One may wonder as to the number of feathers found on the diminutive Helena's Hummingbird (*Calypte helenae*) of Cuba, or the almost equally small Vervain Hummers (*Mellisuga minima*), whose two races inhabit Jamaica and Hispaniola.

Size however is not necessarily a criterion in number of feathers, since a Mourning Dove taken June 11 with 2635 feathers is about equivalent to a female Robin on April 14 with 2587 and not much in excess of a Bluebird on April 1 with 2550. The comparison is not quite fair to the Dove however since it was collected in summer and may well have had more feathers in April when the others were obtained. Comparison between the Hairy and Downy Woodpeckers is of interest, since a male of the former on April 23 had 2395 feathers, while a female of the latter on April 20 had 2009. The difference is not great when disparity in size is considered. Song Sparrows taken from March 5 to 19 ranged from 2093 to 2335, White-throated Sparrows secured from March 12 to 19 ran from 2384 to 2507, Fox Sparrows obtained March 5 to 26 from 2482 to 2757, a Cardinal on April 9 had 2280, and a Red-eyed Towhee April 18 had 2235. The variation here curiously is apparently without particular reference to size.

TABULAR STATEMENT OF FEATHER COUNT.

For further reference for those who may be interested in the subject the following table gives figures for all the birds studied in the present connection. These are listed under their common names as given in the Fourth Edition of the A. O. U. 'Check-List' published in 1931, grouped by families in systematic order. To simplify the table the locality for each has been omitted as this information had no pertinence, all birds coming from a radius of eighty miles from Washington. The common name is used instead of the Latin appelation in order to make the data readily understood by those who are not professional ornithologists.

Species	Date	Sex	Number of feathers	Weight of Bird	Weight of feathers
Columbidae					
Mourning Dove	June 18, 1933	♂	2635	152.7	11.7
Caprimulgidae					
Eastern Nighthawk	June 11, 1933	♂	2265	69.3	5.6
" "	July 9, "	♀	2034	67.9	5.7
Trochilidae					
Ruby-throated Hummingbird	June 11, 1933	♂	940	2.8	.2
Picidae					
Yellow-bellied Sapsucker	Mar. 12, 1933	♀	2242		
Eastern Hairy Woodpecker	Apr. 23, "	♂	2395		
Northern Downy Woodpecker	Feb. 12, "	♀	2584		
" " "	Feb. 12, "	♀	2512		
" " "	Feb. 19, "	♀	2153		
" " "	Mar. 26, "	♂	2020		
" " "	Apr. 20, "	♀	2009		
Tyrannidae					
Eastern Kingbird	May 28, 1933	♂	1868	40.2	3.0
Northern Crested Flycatcher	June 11, "	♂	1570	33.8	2.5
Eastern Phoebe	Apr. 1, "	♂	2033		
" "	Apr. 9, "	♂	2081		
Acadian Flycatcher	May 14, "	♂	1554	13.7	1.2
Eastern Wood Pewee	June 4, "	♂	1495	13.4	1.0
Hirundinidae					
Rough-winged Swallow	June 25, 1933	♂	1369	17.1	1.0
Barn Swallow	June 18, "	♂	1476	17.6	1.4
Corvidae					
Northern Blue Jay	Oct. 8, 1933	♂	1898	97.2	6.8
Paridae					
Carolina Chickadee	Feb. 19, 1933	♀	1704		
" "	June 4, "	♀	1140	9.1	.5
" "	Oct. 8, "	♀	1309	10.0	.8
" "	Oct. 15, "	♀	1256	8.3	.6
Certhiidae					
Brown Creeper	Oct. 21, 1933	♀	1408	8.5	.6
" "	Oct. 24, "	♀	1247	8.5	.6
Troglodytidae					
Eastern House Wren	June 11, 1933	♂	1271	13.3	.6
" " "	July 9, "	♂	1178	11.5	.7
Carolina Wren	June 4, "	♂	1405	21.1	.7
Long-billed Marsh Wren	Apr. 30, "	♂	1433	11.3	.5

Species	Date	Sex	Number of feathers	Weight of Bird	Weight of feathers
Mimidae					
Eastern Mockingbird	June 18, 1933	♀	1601	51.3	3.6
Catbird	June 4, "	?	1733	35.6	2.3
Brown Thrasher	June 11, "	♂	1960	69.2	3.2
Turdidae					
Southern Robin	Mar. 26, 1933	♀	2973		
" "	Apr. 14, "	♀	2587		
Wood Thrush	May 25, "	♀	2075	60.4	3.2
Eastern Hermit Thrush	Oct. 21, "	♂	1884	31.2	2.4
" " "	Oct. 21, "	♀	1873	32.7	2.4
" " "	Oct. 21, "	?	1828	31.9	2.3
Eastern Bluebird	Apr. 1, "	♀	2550		
Sylviidae					
Eastern Golden-crowned Kinglet	Oct. 14, 1933	♂	1268	5.8	.7
" " "	Oct. 14, "	♂	1386	5.5	.6
" " "	Oct. 21, "	♀	1233	5.9	.6
Eastern Ruby-crowned Kinglet	Apr. 9, "	♂	1560		
" " "	Oct. 11, "	♀	1119	6.4	.5
" " "	Oct. 19, "	♀	1289	6.4	.7
" " "	Oct. 15, "	♀	1326	6.2	.5
Laniidae					
Migrant Shrike	May 28, 1933	♂	2170	50.9	3.1
Vireonidae					
White-eyed Vireo	May 21, 1933	♂	1313	12.0	.3
" " "	Sep. 29, "	♂	1542	14.8	.6
" " "	Sep. 29, "	♂	1386	14.7	1.0
" " "	Sep. 29, "	♂	1332	12.4	.9
Yellow-throated Vireo	May 21, "	♂	1664	16.6	1.0
Red-eyed Vireo	June 4, "	♂	1510	17.9	1.0
" " "	Sept. 18, "	♂	1784	18.2	.8
" " "	Sept. 29, "	♂	1531	17.6	.9
Mniotiltidae					
Black and White Warbler	Apr. 9, 1933	♂	1679		
" " " "	May 7, "	♀	1473	13.7	.6
Tennessee Warbler	Oct. 8, "	♀	1348	9.3	.6
Southern Parula Warbler	May 7, "	♀	1422	7.7	.4
Magnolia Warbler	May 7, "	♂	1414	9.4	.2
" "	May 14, "	♀	1493	7.9	.4
" "	Sept. 18, "	♀	1635	9.0	.6
Black-throated Blue Warbler	May 14, "	♀	1527	9.0	.5
" " " "	Sept. 18, "	♀	1620	9.9	.6
Myrtle Warbler	Feb. 22, "	?	2291		
" "	Apr. 1, "	♀	1995		
Black-throated Green Warbler	Sept. 18, "	♂	1688	9.2	.6

Species	Date	Sex	Number of feathers	Weight of Bird	Weight of feathers
Mniotiltidae—Continued					
Blackburnian Warbler	May 21, 1933	♀	1360	11.2	.5
Chestnut-sided Warbler	May 7, "	♀	1396	11.1	.6
" " "	May 7, "	♂	1426	11.4	.7
Bay-breasted Warbler	Sept. 21, "	♂	1718	12.1	.6
Black-poll Warbler	Oct. 15, "	♂	1583	17.6	1.2
Northern Pine Warbler	Apr. 30 "	♀	1685	13.9	1.1
Yellow Palm Warbler	Apr. 23, "	♂	1839		
Oven-bird	Sept. 21, "	♂	1849	21.8	1.5
Louisiana Water-thrush	Apr. 18, "	♂	2146		
" " "	June 4, "	♀	1525	19.6	1.0
Kentucky Warbler	May 14, "	♀	1511	14.4	.7
Connecticut Warbler	Sept. 19, "	♂	1803	13.1	1.0
Northern Yellowthroat	Sept. 18, "	♀	1698	10.3	.7
" "	Sept. 18, "	♀	1508	11.4	.8
" "	Oct. 1, "	♀	1371	9.3	.4
" "	Oct. 1, "	♂	1335	10.2	.6
Maryland Yellowthroat	June 18, "	♂	1351	9.6	.7
" "	Oct. 1, "	♂	1465	10.7	.8
Yellow-breasted Chat	May 14, "	♂	2001	29.6	1.8
" " "	Sept. 28, "	♂	2113	30.8	1.8
Canada Warbler	May 14, "	♀	1473	9.5	.7
" "	May 21, "	♀	1398	9.3	.6
American Redstart	Apr. 23, "	♂	1785		
Ploceidae					
English Sparrow	July 2, 1933	♂	1359	28.1	1.5
Icteridae					
Eastern Red-wing	June 18, 1933	♀	1639	42.6	2.2
Orchard Oriole	June 11, "	♂	1601	24.0	1.5
Purple Grackle	May 28, "	♂	2730	117.7	8.3
Eastern Cowbird	July 2, "	♀	1622	41.4	1.9
Thraupidae					
Scarlet Tanager	May 21, 1933	♂	2023	29.1	1.8
Fringillidae					
Eastern Cardinal	Apr. 9, 1933	♂	2280		
Rose-breasted Grosbeak	May 7, "	♂	2228	48.2	1.7
Indigo Bunting	June 25, "	♂	1480	15.3	.9
" "	July 25, "	♀	1386	15.5	.8
Eastern Goldfinch	Feb. 26, "	♀	2107		
" "	Mar. 5, "	♀	2368		
" "	Mar. 12, "	♂	1916		
" "	Apr. 1, "	♀	1901		
" "	June 25, "	♀	1439	13.3	.8
Red-eyed Towhee	Apr. 18, "	♂	2235		
" " "	Oct. 8, "	♂	1816	42.0	3.1

Species	Date	Sex	Number of feathers	Weight of Bird	Weight of feathers
Fringillidae—Continued					
Eastern Savannah Sparrow	Apr. 30, 1933	♂	1747	17.9	1.3
Eastern Grasshopper Sparrow	June 25, "	♂	1419	18.1	.9
" " "	July 2, "	♂	1249	16.4	1.2
" " "	July 9, "	♂	1224	18.7	.8
Eastern Henslow's Sparrow	May 28, "	♀	1436	14.6	.9
Sharp-tailed Sparrow	Apr. 30, "	♂	1796	18.5	1.0
Northern Seaside Sparrow	Apr. 30, "	♂	1941	24.4	1.5
" " "	Apr. 30, "	♂	1897	26.4	1.6
Eastern Vesper Sparrow	June 25, "	♂	1439	26.9	1.5
" " "	July 2, "	♂	1252	24.5	1.2
Slate-colored Junco	Mar. 12, "	♂	2063		
" " "	Mar. 26, "	♂	1972		
" " "	Mar. 26, "	♂	1961		
" " "	Apr. 1, "	♂	2092		
" " "	Apr. 21, "	♀	1886		
Eastern Tree Sparrow	Mar. 5, "	♀	2594		
Eastern Chipping Sparrow	May 28, "	♂	1511	11.6	.5
" " "	July 9, "	♀	1150	14.3	.9
" " "	July 9, "	♂	1204	12.6	.9
" " "	Oct. 24, "	♀	1313	13.0	.6
Eastern Field Sparrow	Apr. 16, "	♂	1822		
" " "	Apr. 16, "	♂	1849		
" " "	Apr. 23, "	♂	1822	10.8	.9
" " "	July 9, "	♂	1280	11.6	.6
White-throated Sparrow	Feb. 22, "	♀	2710		
" " "	Feb. 22, "	♂	2556		
" " "	Mar. 12, "	♂	2384		
" " "	Mar. 12, "	♀	2436		
" " "	Mar. 19, "	♀	2507		
" " "	Oct. 8, "	♀	1508	24.4	1.8
" " "	Oct. 4, "	♀	1545	27.9	1.7
Eastern Fox Sparrow	Feb. 26, "	♀	2638		
" " "	Mar. 5, "	♀	2757		
" " "	Mar. 26, "	♀	2482		
" " "	Mar. 26, "	♀	2648		
Swamp Sparrow	Apr. 3, "	?	2217		
" "	Apr. 23, "	♂	1953		
Eastern Song Sparrow	Mar. 5, "	♀	2208		
" " "	Mar. 5, "	♀	2093		
" " "	Mar. 19, "	♂	2315		
" " "	Mar. 19, "	♂	2271		
" " "	Mar. 19, "	♂	2335		
" " "	Mar. 19, "	♀	2283		
" " "	July 2, "	♂	1304	20.9	1.1

U. S. National Museum,
Washington, D. C.

THE SNOWY PLOVER (CHARADRIUS ALEXANDRINUS OCCIDENTALIS) NESTING IN CHILE.

BY D. S. BULLOCK.

DR. CHARLES E. HELLMAYR in his book[1] on the birds of Chile in speaking of the Snowy Plover on page 376 says,—"We have no definite record of eggs having been taken in Chile, but Mr. Sanborn tells me that this plover was doubtless nesting on the coast of Aconcagua, and the specimen obtained by him in December at Papudo is in worn breeding plumage.

"It probably breeds all along the sandy sea coast of Chile from Tarapaca to Arauco, the most southern locality being Laraquete where A. Lane secured a couple of adults on August 20 and 22 respectively."

It was my privilege to spend four weeks on the "Isla de la Mocha" in the months of November and December, 1932, making a collection of birds and mammals for the American Museum of Natural History. Mocha Island is situated about twenty miles off the coast of Chile and about one hundred miles south of Laraquete, the southernmost limit from which this species was previously reported.

The birds were fairly common all around the coast of the island wherever the sandy beach stretched back some distance from the water. Four nests with three eggs each were found, as well as several nests in which the eggs had not as yet been laid. All were located from thirty to one hundred yards back from the high water mark.

The nests were generally placed in perfectly plain sight. Some were beside a small bunch of beach grass or a piece of drift-wood. Two, however, were not even beside any plant or rubbish. There seemed to be an attempt to make a nest from small bits of shell and in two of the nests were shells almost as large as the eggs.

The birds were apparently not at the height of the nesting season as many pairs did not as yet have any eggs. By watching the birds from a distance with field glasses it was possible to locate the nesting sites where the birds were gathering together small pieces of shell. When there were no eggs in the nests the birds were fairly tame and one could approach to within forty or fifty feet before the birds took flight. Even then they frequently flew only a short distance and soon returned to the place from which they had been flushed. When there were eggs in the nests the birds were very shy and on several occasions were observed to leave the nest when the person approaching was a hundred yards away.

[1] The Birds of Chile by Dr. Charles E. Hellmayr. Field Museum of Natural History. Publication No. 308. June 13, 1932.

One nest found gave an opportunity to observe the time between the laying of the eggs. When discovered on a Sunday it contained a single egg. On the following Wednesday the second egg was laid and the third the next Saturday. The nests found were on November 21, 22, and two on the 28th.

The birds seemed to be very evenly distributed all around the island where the conditions for nesting were to their liking. As nearly as I could calculate, in the eight or ten miles of sandy coast that they frequented, there must have been between fifty and sixty pairs.

The finding of these nests confirms the probability suggested by Dr. Hellmayr concerning the nesting of this Plover along the coast of Chile. It is, I believe, the first definite record of a Snowy Plover nest south of the equator. It also establishes a southern record for the species thus extending its range considerably. I have a feeling that the range will probably be extended still farther to the south when we know more concerning the shore birds of Chile and their geographical distribution.

This is the second of our North American species which have been shown to have allied resident forms in South America. The Killdeer was shown by Dr. Chapman[1] to be deplaced in northwestern Peru by a very similar resident type. Hellmayr established the same for the present species. The question naturally arises, how many more species are there in which a similar condition exists?

In going over the literature on the geographical distribution of our North American species of shore-birds I find that there are constant references made to the fact that some non-breeding birds stay during the breeding season "in the southern states," "along the coast of the Atlantic," "in northern South America," "along the Gulf of Mexico," etc. Is it not possible that these are really South American birds that have gone north for the winter months of the southern hemisphere?

It is my expectation that when the shore-birds of southern South America are as well known as are those of North America it will be found that quite a number are allied forms of the North American species.

The following birds are among those mentioned by different authors as not all returning to their North American nesting sites as would be expected of them,—Dowitcher, Black-bellied Plover, Hudsonian Curlew, Baird's Sandpiper, Sanderling and Greater Yellow-legs.

I have been assured by Indians living along the coast of Chile that the Hudsonian Curlew nests quite commonly but I have never been in a position to make a systematic search for them.

Dr. Frank M. Chapman in speaking of a cruise made out from Guayaquil, Ecuador says[2] "This cruise took us into many little-frequented water-ways

[1] Auk, 37, p. 106, 1920—Paletillas, n.e. of Payta, Piura, Peru.
[2] Autobiography of a Bird-lover by Frank M. Chapman, p. 348.

on Puna Island and the mainland and southward nearly to Peru. It was notable chiefly for the discovery of a large number of our shore-birds which, at that season, mid-July, should, theoretically, have been north of the Arctic Circle nesting. There were Black-bellied Plovers, Hudsonian Curlews and Dowitchers. All were apparently in winter plumage, and the sexual organs of those collected were dormant. Evidently these non-breeding birds had received no inner prompting to return to the region of their birth to reproduce their kind and hence were remaining in their winter quarters during the summer. With these boreal birds were others equally characteristic of the austral regions which, in this subequatorial winter, were at the northern limit of their range."

Why should these North American birds remain in their winter home during the breeding season? Or are they North American birds? I think we shall find that many if not all of these are not North American birds at all but South American birds which later on will be breeding, down toward the end of the continent.

Here is an excellent field not only for the Chilian students of ornithology but also for some of the expeditions of the larger North American Museums to do some original research.

El Vergel, Casilla 2 D.,
Angol, Chile.

A SUMMARY OF RECENT EVENTS PERTAINING TO THE BLUE AND LESSER SNOW GOOSE.

BY L. L. SNYDER AND T. M. SHORTT.

FOR comparison with recent events, it seems of value here to attempt first a brief review of the usual spring and autumn movements of the Blue Goose (*Chen caerulescens*) and that segment of the population of the Lesser Snow Goose (*Chen hyperborea hyperborea*) with which it is usually associated.

The Blue Goose winters mainly on the Gulf coast of Louisiana.[1] In the spring, late March,[2] it starts its migration northward with a contingent mixture of lesser Snow Geese. The general course followed is through the continental interior approximately along a line which traces or parallels the Mississippi Valley. No great stopover area is known within this broad region, but beyond it, at Meadows[3] (and vicinity), near Winnipeg, Manitoba and at Whitewater Lake, Manitoba,[4] many of these birds congregate. The Whitewater flocks, and, prior to 1925, those at Meadows, have been predominantly Lesser Snow Geese. It is improbable that the entire Blue Goose population stops at these two places, though it would seem that a large percentage does so. About the subsequent course of these flocks or stop-overs made by others, we know very little. Occasional flocks of "waveys" which probably include Blue Geese are seen passing northward as far east as Port Arthur. Perhaps these flocks make a direct course for James Bay.

After a stay of from four to five weeks in southern Manitoba, the Geese continue northward. Bent[5] states that "the main flight in spring seems to pass up the east side of James Bay." Discrepancies between the departure dates from Manitoba and arrival dates on their breeding grounds[6] indicate loitering about the shores of James and Hudson Bays.

After the breeding season, Blue Geese gradually shift southward to the tidal flats on the coast of James Bay. This movement starts in late August. During September, together with Lesser Snow Geese, they congregate in large flocks on the east and west coasts of James Bay and more particularly at Hannah Bay at its southern extremity. Here they normally remain until the advent of a pronounced freeze-up, whereupon there is a sudden and usually complete exodus. According to O. J. Murie (Bent), the departure is made in late October or early November. The route followed to their

[1] A.O.U. Check List, Fourth Edition, 1931.
[2] McIlhenny, E. A. Auk, July, 1932, pp. 291–301.
[3] Cartwright, B. W. Canadian Field-Naturalist, Nov. 1931, pp. 181–182.
[4] Harrold, C. G. Auk, July, 1928, pp. 290–292.
[5] Life Histories of North American Wild Fowl, Bull. 130, U. S. Nat. Mus. p. 179.
[6] Sutton, G. M. Memoirs of the Carnegie Museum, Vol. XII, Part II, Section 2, p. 55: Soper, J. Dewey. The Blue Goose. Dept. of the Interior, Ottawa, 1930.

restricted wintering ground is largely unknown. Numbers of Blue Geese and Lesser Snow Geese stop in southern Manitoba on the fall migration but not in such large numbers as in spring.

It is generally supposed that most of these birds make a nonstop flight from James Bay to the Gulf of Mexico. There have been few reports of their occurrence in Ontario other than in the James Bay region. However, they must annually have passed over extensive portions of the province on their course south or west.

The above remarks have sketchily described the seasonal movements of these birds, which may be regarded as normal. Recent occurrences in connection with the movements of Blue Geese (and Lesser Snow Geese) indicate a variation from the normal as outlined above.

As early as the spring of 1929, Winnipeg ornithologists were led to believe that the number of Blue Geese at Meadows was larger than during former years. To convey some idea of the Meadows congregation of Geese in the spring of 1929 and the following year, a few extracts from the journal of the junior author are quoted:

"*April 24, 1929:* . . a prolonged cold spell has kept the Geese from moving away from their excellent feeding grounds at 'Grant's Lake' while they continue to arrive in from the south. In some of these fine flights, coming up from the south and settling about the flooded meadows, as many as four to five thousand birds constitute a flock . . . ."

"*April 18, 1930:* . . Geese have arrived in even greater numbers than last year. The residents of Rosser, Meadows and Grosse Isle state that they have never seen them so numerous. The Blue Geese are overwhelmingly in the majority this year, the proportion being about ten Blue Geese to each Lesser Snow Goose. Last year, I doubt if the ratio was more than five to one . . . ."

The spring flights of 1931 and 1932 were also very large. In the spring of 1933, a very marked increase of Geese which stopped at Meadows was reported to the writers by Mr. A. H. Shortt of Winnipeg. The number returning in the fall was also increased. This applied both to the Blue Goose and the Lesser Snow Goose, but the former greatly outnumbered the latter. There appears to have been no marked evidence of this increase in the east in 1933, since the few available records of occurrence (Kingsville, Ontario) in the spring and fall of that year were of the usual casual nature.

In the fall of 1934, it was evident that many Blue and Snow Geese were exhibiting an unusual tendency to stop for a time in southern Ontario. Beamer[1] has recorded the appearance of large numbers at Meaford, Ontario, and there were further reports (mss.) from Thornbury, Dundalk and Wasaga

[1] Canadian Field-Naturalist, Nov. 1935, p. 137.

Beach in the Georgian Bay region; from King, Belleville, Bloomfield, Toronto, Hamilton, Melrose, Long Point and Rondeau in the southern Ontario peninsula and the lower lakes region. The foregoing records appear to concern both species rather indiscriminately but the Lesser Snow Goose was most definitely identified. The extraordinary distribution of Blue and Snow Geese during the winter of 1934–35 has been well and adequately reported on by Cottam.[1]

Reports from Winnipeg during the subsequent spring (1935) demonstrated that these Geese had maintained their great numbers, and were apparently moving north approximately along their usual course. An estimate totalling half a million birds was made for the Meadows congregation, Blue Geese outnumbering Lesser Snow Geese very pronouncedly.

That these birds, particularly Blue Geese, experienced a successful summer in 1935 was evidenced by the fall flight. In the following account, it is not possible to give accurate ratios of the Blue Geese and Lesser Snow Geese involved. The most reliable accounts which concern large numbers observed estimate from 10 to 20 Blue Geese to 1 Lesser Snow Goose.

Mr. L. H. Beamer, who estimated a total of twenty thousand birds on this flight at Meaford on Georgian Bay, states that advance flocks reached there on October 22. Many subsequently came to rest in that vicinity. The greatest number of birds was seen, however, two or three days later. The peak of this fall flight appears to have been on the 26th when great numbers were seen, in many parts of the southern Ontario peninsula and in the north. From our scattered records, it seems probable that, geographically for that day, observations commenced with those of Mr. Murray Speirs at Timmins, southern Cochrane District. He observed five flocks of Geese totalling approximately 750 birds passing southward on the 26th. Snow Geese were definitely identified in one flock; others were too high for determination. Circumstances suggest that these flocks were a part of the great flight of Blue Geese (and Lesser Snow Geese) which came down from the north that day.

To continue with events pertaining to the 26th, observers in localities adjacent to Meaford were also noting the passing birds and the occasional flocks which settled (Collingwood, Owen Sound, and Goderich on Lake Huron). Southward, we have the observations of Mr. Charles Molony, who saw fully a thousand Geese pass overhead from his position on the flats of the Holland river, Simcoe County, at 4 p. m. At Puslinch Lake, near Guelph, according to Mr. H. G. Mack, from two to three thousand birds came to rest. At Toronto, "many thousands" of these birds passed over in the late afternoon of the 26th. One observer stated that the sky overhead was full of the "cobweb strings" of flying Geese passing southwestward.

[1] Auk, October, 1935. pp. 432–441.

Crowds of people out-of-doors at athletic events rose and cheered the flying Geese, forgetting their sport for the moment.

The breadth of the flight on this day is indicated by the reports from Lake Huron (Dr. C. H. D. Clarke, Goderich) to Toronto. Stratford, Hamilton and Beamsville records suggest the convergence of the flight in the Niagara district, where apparently the greatest spectacle of Geese was to be observed. News accounts in the Toronto papers described "Myriads of Wild Geese Battling Against Death Above Falls at Niagara." There is no doubt that reports of the congregations of Blue and Snow Geese on the Niagara river (Mr. R. W. Sheppard) and adjacent sections of Lake Ontario (Dr. W. E. Hurlburt) indicate a remarkable event, one without recorded parallel. A few birds were destroyed by being swept over the falls.

The duration of this stop-over in southern Ontario was approximately one week, although flocks and individuals remained longer, particularly in the Georgian Bay region. The large flocks which settled on Puslinch lake (Waterloo County) on October 26 left early on the morning of November 2. Mr. George North, who estimated a total of 14,000 Geese, at or passing over Hamilton, reported that the flocks which settled on Lake Ontario and on Hamilton Bay departed, for the most part, on November 1. It appears that October 28 was the date of departure of the large body of Geese from the Niagara River, although many remained until later. Mr. P. A. Taverner informs us that he heard many Geese flying about on the night of October 28 or 29 at Lansing, Michigan, and heard of similar occurrences taking place at Battle Creek. These records suggest a trend toward the Mississippi valley.

The numbers involved in the 1935 fall flight and the stop-overs made in southern Ontario are unprecedented. The course taken by these birds seems to be unusual insofar as we can judge by the casual information covering previous periods.

As to the time of departure from James Bay, we may assume that the period between October 22 and 26 covers both the advance migrants (Meaford) and the bulk of the flight which was reported from throughout the western portion of southern Ontario. Birds leaving James Bay at daybreak and travelling forty to forty-five miles an hour would reach south Ontario by late afternoon.

Reference to meteorological records of conditions which prevailed at Moosonee from October 22 to 26 are given below:

Date	*Minimum Temperature*	*Maximum Temperature*	*Precipitation*
Oct. 22	28°	30°	nil
23	16°	34°	nil
24	24°	30°	nil
25	30°	40°	.16 in. (rain)
26	24°	30°	

A perusal of records pertaining to weather subsequent to October 26 shows that decidedly cold, "freeze-up" conditions did not set in at Moosonee, until November 6, in fact, mild weather prevailed during most of the first week in November. If it is true that Blue and Lesser Snow Geese normally remain until the advent of a pronounced freeze-up, as is generally supposed, then the 1935 exodus was not normal.

In searching for factors affecting Blue and Lesser Snow Geese of recent years, we have considered the advent of white hunters in the fall on southern James Bay. The number of hunters frequenting this area has increased annually since the completion of the railroad to Moosonee in September, 1931. Special railway inducements during the fall of 1935 probably further increased the sportsman traffic. Conversation with a well informed person who has had continuous first hand experience in the James Bay region before and since the building of the railroad makes it obvious that the fall congregations of Geese are finding it increasingly difficult to feed and rest at Hannah Bay during September and October. During periods of high tide the Geese are forced in to the hunters and are then greatly handicapped in coming to rest. It is conceivable that such a disturbance might induce their departure in advance of a normal meteorological stimulus. Supposing this to be the case, the abnormal stop-overs en route to wintering quarters might result as a secondary effect.

Whether or not there is any correlation between disturbances on James Bay, date of departure and stop-overs made by the 1935 flight, one relationship seems established. The events pertaining to the Blue (and Lesser Snow Goose) in the fall of 1934, in the winter of 1934–35 and the fall of 1935 coincide with a period of great numbers. Dense populations in the case of other animals often form the background for extralimital occurrences and abnormal behaviour. In the present case, it has not been possible to arrive at any estimate of total numbers of Geese passing through southern Ontario. It would seem, however, that the Ontario flight, large as it was, did not represent a population approaching the estimated numbers of Blue and Lesser Snow Geese in spring in southern Manitoba. It seems most probable that we were experiencing the marginal portion of the flight which may have passed south farther westward.

As a matter of record, one additional fact relative to the Blue Goose may be stated. From the casualties of the birds which were swept over Niagara Falls, nine unselected birds were secured as scientific specimens; eight were females.[1]

Royal Ontario Museum of Zoology, Toronto, Ont.

[1] cf. also pp. 204–208.

THE CAUSE OF BLUE COLOR AS FOUND IN THE BLUEBIRD (SIALIA SIALIS) AND THE BLUE JAY (CYANOCITTA CRISTATA).*

BY CARL GOWER.

INTRODUCTION.

ALL the colors which one observes in bird feathers are due to one of two things: either to a pigment, or to some modification in the structure of the barb, producing what is known as structural color. The pigment colors are black, brown, red, yellow, and in a few cases green, while the blues, whites, some of the greens and metallic and iridescent colors are due to structure. These facts are accepted by biologists and have been worked out by them and by physicists. The work presented in this paper has been done to determine if possible something of the real nature of the structures causing the color found in the Blue Jay (*Cyanocitta cristata*) and the Bluebird (*Sialia sialis*).

The cause of blue color in feathers was first investigated by Fatio (1), who published a paper on this subject in 1866. He discovered that the blue color is localized in a distinct layer, but does not mention the fact that the color is restricted to the walls of the cells of the layer. He called this layer "email." He also said that there appears under the layer of prismatic cells a layer "de grandes cellules polygonales a noyau colors," but of the later workers, Gadow supposes this to be an optical illusion on the part of Fatio.

Following Fatio, Gadow (1) published a more intensive paper in 1882, including all types of coloration. His explanation of blue color is of particular interest. He attributes the blue to a series of fine lines running parallel to the long axis of the cones (color-producing cells), although taking into account other factors as a possible cause. One paragraph from his paper will give his conclusions better than I can summarize them.

"Let us throw only a furtive glance at some of the changes which the light falling upon and passing through a blue feather is likely to undergo. First, part of the rays will be simply reflected from the outer surface . . . ; secondly, the rest, before passing through this stratum, will be variously broken and reflected *before* reaching the coating . . . , since the stratum . . . is not homogeneous, but consists apparently of several irregular scales and secondary strata; thirdly, the coating, . . . , breaks the rays again and partly reflects them, and, if it is only 0.0006 mm. thick, as in *Pitta*, it is thin enough to allow the application of the theory

*An abstract of a thesis submitted in partial fulfillment of the requirements for the degree Master of Science in the Louisiana State University.

of thin-plate colors; fourthly, the system of ridges; fifthly, some rays will reach the layer of brownish pigment. How much of them is absorbed, how much reflected as brownish light, and what the changes are of this brown light before it comes up again to the surface, we cannot tell. Again, the ray *a* will be under different conditions to the ray *c*. To follow and to calculate all these changes would be almost a superhuman task. We know only the result, namely blue color."

Thus we see that as far as coming to any definite conclusions regarding the cause of the blue color Gadow's work was inconclusive, but it has been of great value to later investigators on this problem in that it has given them some basis from which to work.

In 1902 Häecker and Meyer (2) published a paper in which they followed up Gadow's lead, but due probably to better facilities for research they reached entirely different conclusions as to the blue color. Their reasons as given by them are:

"1. The difference between the refractive indices of the cell substance and air without, involving the hypothesis that this difference is distinctly greater for blue than for red.

"2. The small size of the pores whose diameter is small in comparison with a wave-length of light."

In other words, they believe that the blue light is due to the scattering of light by minute pores in the walls of the blue-producing cells.

Mason's work (3) (4) published in 1923 is the only work that has been done in this country on this problem. He was aided in this research by Bancroft, Chamot and Merritt, all of Cornell University. As far as results are concerned, his work has added absolutely nothing to that of Häecker and Meyer, and it will not be necessary to say more than to quote his conclusions.

"1. Non-iridescent blues of feathers are due to the scattering of blue light by very fine pores in the walls of the outer layer of cells of the barbs of the feather. This is the blue described by Tyndall, which is commonly observed in turbid media.

"2. No blue pigments, and no other structural causes of blue color have been observed in non-iridescent blue feathers.

"3. Green feathers are essentially the same as blue feathers, except that the blue cells are overlaid by a transparent yellow layer."

With this work as a basis, I have chiefly attempted to discover, if possible, the nature of the structures which are responsible for the break-up of the white light. From the first, I have never been able to see any thing which resembled pores, and so I have been interested in checking Mason's work, to determine, if possible, the exact nature of the structures present.

The author wishes to express his indebtedness to Dr. Elinor H. Behre, Professor of Zoology in the Louisiana State University, for her many helpful

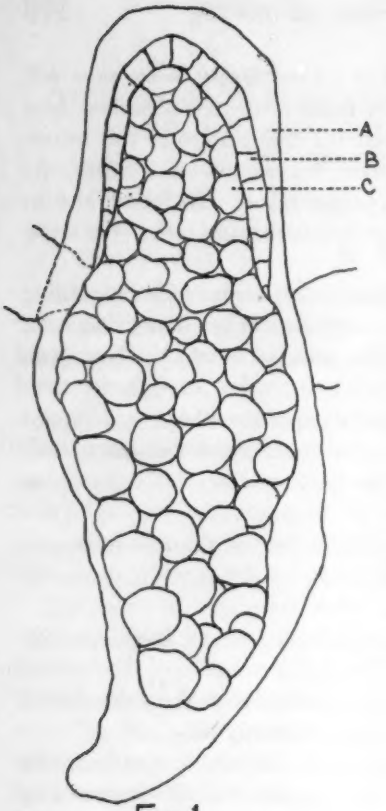

Fig 1

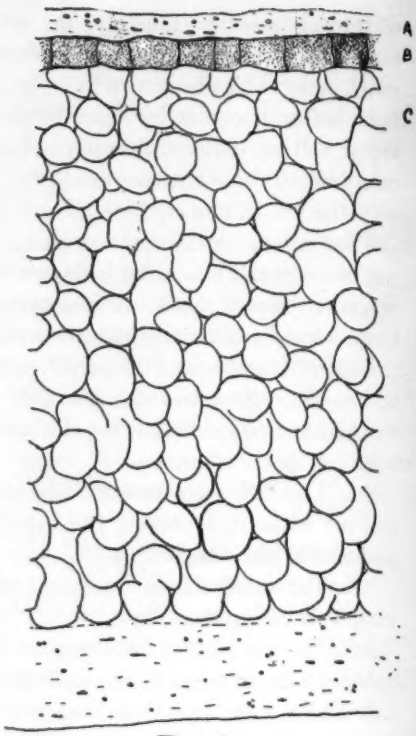

Fig 2

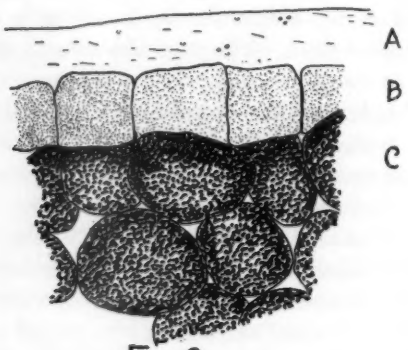

Fig 3

Fig. 1. A cross section of a Blue Jay barb showing shape of barb and size, position, and relation of various parts. A, sheath; B, blue producing cells; and C, pigment cells. (× 450.)

Fig. 2. A camera drawing through a sagittal section of a Blue Jay barb. A, dorsal portion of sheath; B, blue producing cells; and C, pigmented cells. (× 450.)

Fig. 3. Camera drawing of the blue producing cells with bodies and pigment cells with pigment. A, dorsal portion of sheath; B, blue producing cells; and C, pigment cells. (× 1000.)

suggestions and criticisms during the work and the writing of the manuscript; to Dr. A. R. Cahn and Dr. Frank H. Brown Jr. of the Zoology Department of the University of Illinois who have read the manuscript and given the author valuable suggestions in its preparation for publication. And to Dr. Mary M. Steagall, Head of the Department of Zoology at the Southern Illinois State Normal University, who suggested this problem to the author, and who guided the preliminary stages of the research.

METHODS.

The problem here was one of acquiring a technique by which sections of a known thickness might be cut. This is extremely difficult due to the brittleness of the keratin of the sheath, and a great many different methods were used before the author was able to make sections suitable for study.

In preparation for sectioning the barbs are first cut close to the shaft and made into a roll by means of a fine thread, then treated as follows:

1. 24 hours in the following solution: Nitric acid (conc.) 20 parts; .5% Chromic acid 20 parts; Mecuric chloride in 20% alcohol, 20 parts; Picric acid (st. sol. in H_2O) 10 parts. Absolute alcohol 30 parts.
2. Wash in 50% Iodine alcohol for 12 hours, and then slowly dehydrated.
3. Cleared in Methyl salicilate.
4. Infiltrated and imbedded in 55° paraffin.
5. Sectioned 4–20 microns (best at 10).
6. Mounted unstained in balsom.

Staining was found to be quite superfluous, and was not used.

Bleaching was done by using a 3% solution of Hydrogen peroxide and also by using a 1% solution of sodium hydroxide. Feathers were left a month or longer in the latter mixture to complete the process.

Gross sections were best made by embedding in clear shellac, after which cuts were made free hand and mounted on slides with balsam. Such cuts were quite valuable in studying the relationship of different layers of the barb.

MORPHOLOGY OF THE BARB.

In order to clarify the process of blue production by the feather, it is necessary to describe in detail the structure of the barb. Gadow (1), Häecker and Meyer (2), and Mason (3) have each described the structure of the color-producing barbs, but their description seems to me to be inadequate. In each case, they have failed to make clear the exact location of the color-producing cells, and this gives the impression that they occur as a complete cylinder within the sheath. Their description also gives the impression that the barb would appear round in cross section, and this is not the case at all.

When examined with a magnification of 450, a cross section of a barb of a Blue Jay feather appears to be shaped more or less like an Indian Club, the dorsal portion of the barb representing the handle of the club, and the ventral portion being extended into a drawn out, pointed base, which is curved slightly to one side (Fig. 1). The three different regions of the feather are plainly visible, but some explanation of their relationship is necessary. The sheath is very variable in thickness, and from a number of measurements made with an ordinary ocular micrometer, I obtained a range of 7.2 to 21.6 microns in thickness. By far the thickest portions of the sheath are at the dorsal and ventral margins of the barb, while the lateral portions of the sheath are about one half as thick (Fig. 1). The blue-producing cells do not occur as a complete cylinder within the sheath, but are found on the dorsal side and extending about half way down the side of the barb. This location is further proven by the fact that only the dorsal side of the barb is blue, while the ventral side is black. The center of the barb is filled with large roundish cells containing large granules of melanin pigment. This pigment is so thick as to give the feather a black appearance wherever the blue-producing cells are absent.

The sheath is more or less transparent, having a slightly yellowish tinge in sections, and showing granulations and irregularities throughout. These irregularities appear as air bubbles, and stratification lines due probably to the uneveness in laying down. The keratin seems to be laid down in very uneven layers, and thus produces the lines referred to. In many places there are small foreign bodies which appear to have been imbedded in the keratin when it was laid down. These extremely small particles are in most cases smaller than the pigment granules. Gadow (1) has described the inner surface as being "waved" or scalloped to fit closely to the underlying cells, which he says are mound-shaped; but the author found these cells to resemble cuboidal epithelial cells in that they are almost cubical in shape, and hence very even in outline. The function of the sheath seems to be entirely protective. One thing would seem to indicate this, and that is that the sheath is thicker at the dorsal and ventral margins than on the side; the dorsal and ventral portions of the barb being more exposed to mechanical injury than any other part of the barb, would need better protection.

Underneath the sheath, on the dorsal portion of the barb, lies a layer of polygonal cells (appearing square in section) which under the lower powers (under 450) appear as nothing but slightly visible cell walls. The cells measure approximately 15 microns in diameter, while the height varies with the position. The cells in the center are the tallest, the height decreasing ventrally, giving the layer of cells a crescent appearance. Under the higher magnifications (1000–2000) these cells appear to have a cavity in the center,

roughly spherical in shape, and the walls appear tuberculated. In the walls of these cells are minute, almost ultra-microscopic bodies. Häecker and Meyer (2) and Mason (3) have referred to these as pores, and have given measurements of .3 micron for them in the *Malurus* feather. In the Blue Jay feather and Bluebird feather, from which this study has been made, these bodies were found to be immeasurable with ordinary Leitz micrometers. They have no regular arrangement, but seem to be evenly dispersed throughout the cell wall. I am considering them bodies, because of evidence which I shall present later. Gadow (1) has described the transparent cells as having laminae, but I was unable to find any evidence of these.

The cellular part of the barb is made up chiefly of the pigment cells, which, aside from the layer of transparent cells, occupy the entire cavity of the feather. These cells are roughly cuboidal, rounded at the corners, and have a spherical cavity in the center. They are approximately 19–20 microns in diameter, and there are often open spaces between cells, probably due to the withdrawal of the connective tissue when the cells around it die. The pigment cells lying next to the transparent cells, however, present a very smooth surface to those cells, and are more heavily pigmented than any of the other cells. The pigment granules are elliptical in shape, and measure about 1.6 by .8 microns. They appear brown in sections, but when very densely concentrated appear black. They are zöomelanin, which, according to Gadow, is probably the most common pigment found in animals.

EXPERIMENTAL WORK AND RESULTS.

In the preceding section, I have stated that the structures effecting the breaking up of white light, and thus giving rise to the blue color, are bodies. Häecker and Meyer, and Mason have each after a great deal of study concluded that the structures are pores in the cell walls of the color-producing cells, and this statement has never been questioned. Mason's experiments have been checked in this work, and the problem has also been investigated from another angle, that of microscopic examination, and the results obtained all indicate that the structures are solid bodies and not pores.

Mason based his conclusions chiefly upon the experimental work which he did involving the permeation of the feather by a liquid of refractive index of approximately 1.54. According to his experiments when a feather is allowed to become permeated by such a liquid, it loses its blue color and assumes a brownish-black color due to the underlying pigment. This, he explains, is due to the fact that the pores become filled with the liquid, and the difference in refractive index between the walls of the pore and the air in the lumen is eliminated, thus destroying the blue because the light is no longer broken up by the pores. In other words, the blue-producing pores,

when filled with a suitable liquid, no longer exist optically, but the entire layer of color-producing cells has become homogeneous and transparent to light. Mason further states that as soon as the liquid is allowed to evaporate the blue color is restored, the pores once more becoming functional. He does not state whether or not all the blue feathers mentioned in his paper were treated thus, but his conclusions seem to imply that all blue feathers are alike in this respect. He used a number of liquids for this work, and I have checked with enough of these to eliminate any error on that score. Most of those used have a refractive index of 1.52–1.54, or approximately that of the feather. I have checked Mason's work with methyl salicilate (refractive index of 1.534), with xylene (refractive index of 1.49), and with cedar oil (refractive index of 1.51). Barbs of Blue Jay and Bluebird feathers have been left in these liquids for as long as six weeks without any noticeable change in the blue color. This period is long enough to eliminate any question of whether the feather is permeated or not, but the fact that a feather may be completely bleached in 48 hours would prove that permeation of the feather does not take such a long period. According to Mason's hypothesis any liquid having the proper refractive index should have the same effect on the blue, and enough different liquids of the proper refractive index have been used in this investigation to offer a reasonable check on his work.

A careful microscopic study of the structures in question also bears out that they are bodies and not pores. They were studied with a Zeiss microscope, having a magnification of 1980 times, and they appear as small black bodies in the walls of the transparent cells. If they were pores, they would show a lumen as one focused up and down on them, but this is not the case. In focusing up and down at no time was there seen anything that resembled the appearance of a lumen. Other capable people have checked this point and their observation agrees with those set forth here. The fact is that in certain bacteria, where pores are present, the pores are plainly visible as such and show a distinct lumen. This makes it reasonable to suppose that if pores were present in the cells of the barb they would show the same characteristic.

Another thing which would tend to prove that the structures are bodies and not pores is the fact that when treated with a solution of .3% potassium hydroxide in hydrogen peroxide the bodies disappear. This solution bleaches very rapidly and barbs which have been treated with this solution for 48 hours show absolutely no trace of the bodies. When bleached in ordinary .3% hydrogen peroxide, however, the bodies are unchanged. This would indicate that they are of such a nature that they are soluble in a very weak solution of hydroxide. A solution this weak will not effect a softening of the barb itself in less than two months.

CONCLUSIONS.

1. The structural color of blue feathers (turbid blue) is due to the scattering of light by small irregular bodies which have been laid down in the transparent layer of cells of the barb, and also to the fact that the pigment cells, in acting as a dark background, allow only the blue light to show.

2. These transparent blue-producing cells are found only on the dorsal surface of the barb.

3. With magnification of 1900 or less the bodies are not measurable.

4. Neither in appearance nor by immersion in a suitable liquid do they resemble pores.

5. There are pores and granulations in the sheath of the barb which may aid to some extent in the breaking up of the light.

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The W. K. Kellogg Bird Sanctuary,
Battle Creek, Michigan.

NOTES ON A SMALL COLLECTION OF BIRDS FROM THE REPUBLIC OF HONDURAS.

BY H. G. DEIGNAN.

THE writer spent the period from March 18 to May 1, 1933, at the port of La Ceiba on the northern coast of Honduras. It was my intention to penetrate into the ornithologically unexplored range of mountains, the highest in the Republic, which runs parallel to the coast some ten miles inland from this port; however, due to recently ended political troubles, the country was still under martial law, and it proved to be impossible to obtain from Tegucigalpa a permit to land ammunition. That a small number of birds were collected is due solely to the illegal activities of local smugglers, who, unfortunately, had only large-size shot, for which they demanded a fabulous price.

Not having much work to occupy my time, I took particular pains to note down the colors of the soft parts of the specimens taken, a feature which is often neglected by collectors because of the pressure of other duties, and these notes are incorporated in the present paper.

In working out the collection I have found of great service Dr. Witmer Stone's paper on the Birds of Honduras (Proceedings of The Academy of Natural Sciences of Philadelphia, v. LXXXIV, 1932, pp. 291–342), in which are listed all forms known from the country up to the date of issue. To this list may be added the following birds, represented in my collection, and now, for the first time, I believe, recorded from the Republic:

1. *Ixobrychus exilis exilis* (Gmelin).
2. *Buteo platypterus platypterus* (Vieill.).
3. *Busarellus nigricollis nigricollis* (Latham).
4. *Eurypyga helias major* Hartlaub.
5. *Charadrius hiaticula semipalmatus* Bonap.
6. *Charadrius collaris* Vieill.
7. *Arenaria interpres morinella* (Linn.).
8. *Erolia melanotos* (Vieill.).
9. *Erolia fuscicollis* (Vieill.).
10. *Calidris canutus rufus* (Wilson).
11. *Limosa fedoa* (Linn.).
12. *Crocethia alba* (Pallas).

For the sake of completeness it may be noted that through an oversight one bird was left out of Dr. Stone's list; *Tangara lavinia cara* (Bangs) described from Ceiba, Honduras (Proc. Biol. Soc. Wash., xviii, 1905, 155).

In addition to these, specimens were taken of *Squatarola squatarola* (Linn.), and of *Sayornis nigricans aquatica* Sclater & Salvin, listed by Dr. Stone on the basis of sight-records. Certain others of my specimens represent an extension of the known range of the species.

As everywhere in the lowlands of Central America, bird-life about La Ceiba was abundant both in regard to individuals and to species. The vicinity of the town embraces a variety of country, including swamp, rain-forest, open woodland, marsh, sea-beach, mangrove, and the jungle-fringed river Cangrejal; cultivation is almost non-existent, outside of occasional fruit-gardens and coconut plantations.

All specimens were taken at sea-level (unless otherwise indicated) in the neighbourhood of La Ceiba, excepting two birds collected by Dr. W. D. Strong of Washington during an archæological expedition up the river Patuca in eastern Honduras in the spring of 1933, for which credit is given in the proper places.

I should like here to express my appreciation of the kind offices freely given on numerous occasions of Sr. D. Miguel Moncada, Collector of the Port of La Ceiba, and of Sr. D. Anfbal Fúnes, then Postmaster of the same town. I have also to thank Mr. J. T. Zimmer of The American Museum of Natural History for the loan of specimens and Dr. Herbert Friedmann of the United States National Museum for advice and the free use of specimens in the collections under his care.

Except for a few birds sent to Mr. H. B. Conover, the collection is now in the United States National Museum.

1. **Crypturellus soui meserythrus** (Sclater). ♂, 5 April, testes small. Irides tan; eyelids light brownish; maxilla brownish-black; mandible horn, darker on edges of commissure, basal half horny-yellow; feet and toes greenish-yellow, tarsi bright yellow behind; claws horn. Hard seeds in stomach. ♀, 7 April, ovaries enlarged. Mandible brownish-black, including edges of commissure, basal half horny-white; feet and toes yellow, tarsi brighter behind; otherwise coloured like ♂. ♀, 27 April, ovaries greatly enlarged. Eyelids yellowish-grey, edged dull yellow; maxilla black, extreme tip and about nares grey; mandible pale yellow, tipped grey; rictus yellow; inside mouth pinkish-yellow; feet and toes light yellowish-olive, tarsi yellower behind; claws yellow-horn; otherwise coloured like ♂. Stomach and crop contained seeds and a beetle. This bird is common in the undergrowth along roadsides.

2. **Ixobrychus exilis exilis** (Gmelin). ♀, 25 April, ovaries small. Irides creamy-white; orbital skin yellow; bill yellow, fleshy beneath on basal half; culmen yellowish-brown at base, gradually passing through darker brown to black at tip; feet and toes yellowish-green, soles and tarsi behind bright yellow; claws brown. Stomach contained a small fish. This species has not previously been recorded from Honduras. The measurements, here given, leave little doubt that it should be assigned to the typical race: Wing: 110; Tail: 38; Culmen: 42; Tarsus: 40; Middle toe: 40.4.

3. **Buteo platypterus platypterus** (Vieill.). ♂, imm., 10 April, testes small. Irides brown, with paler outer ring; eyelids edged olive-green; bill black, plumbeous at base; rictus yellow-green; cere bright yellow; feet and toes yellow; claws black. Stomach contained insects and a small mammal. Not previously recorded from Honduras.

4. **Asturina nitida micrus** Miller & Griscom. ♀, ad., 1 April, ovaries small. Irides dull brown; orbital region olive-grey; eyering yellow; lores plumbeous; bill black, plumbeous at base; cere, rictus, and skin of chin, yellow; feet and toes yellow;

claws black. Stomach contained a lizard. ♂, imm., 3 April, testes small. Orbital skin olive-green; lores greenish-yellow; otherwise coloured like ♀. Stomach contained a lizard. A very common species in lightly wooded country.

5. **Buteogallus anthracinus anthracinus** (Lichtenstein). ♀, ad., 4 April; collected at the nest. Irides brown; orbital skin and eyering dull yellow; lores, cere, rictus, and skin of chin, bright yellow; bill black, basal half horn-grey; feet and toes yellow; claws black. Stomach contained crabs. ♀, imm., 4 April, ovaries small. Eyelids pale greenish; otherwise coloured like the adult. Crabs in stomach. A common species, especially in the mangrove swamps.

6. **Busarellus nigricollis nigricollis** (Latham). ♂, 14 April, testes small. Irides brown; orbital skin, lores, and rictus, plumbeous-blue; bill and cere black; feet and toes dead-white; claws black. A pair of this fish-eating Buzzard haunted a tree-bordered estero. The species has not previously been recorded from Honduras.

7. **Micrastur semitorquatus naso** (Lesson). ♂, ad., 23 March, testes small. Irides hazel; bill slaty-black; orbital skin, lores, cere, and rictus, olive-green; bare skin of chin yellow; feet and toes chrome-yellow; claws slaty-black. This specimen, the only one seen, was shot from the top of a bush along a road.

8. **Falco albigularis albigularis** Daudin. ♀, 24 March, ovaries active. Irides brown; orbital skin, cere, rictus, and skin of chin, bright yellow; bill black, mandible yellow at base on sides; feet and toes chrome-yellow; claws black. A pair of these birds appeared to be nesting in a hole in a dead tree about forty feet from the ground. Its cry is very like that of *Falco sparverius*.

9. **Ortalis vetula plumbiceps** (Gray). ♂, 10 April, testes enlarged and of a grey colour. Irides brown; lores and orbital skin slaty-black; bill slate, apical half plumbeous; skin of chin slaty-black; naked skin of throat rose, narrowly edged slaty-black; feet and toes plumbeous; claws dark horny-brown. Stomach contained fruit. Locally common in dry, scrubby jungle.

10. **Aramus scolopaceus dolosus** Peters. ♂, 12 April, testes small and coloured slate. Irides dull light brown; eyelids edged light brownish; bill light brown, tinged orange, tip blackish, culmen olive-brown on basal half; feet and toes grey, tibiae somewhat paler; claws black. Stomach contained gastropods. This was the only Limpkin seen. It was first seen moving agilely from branch to branch of a large tree overhanging an estero, and, falling into the water, it swam with ease to the shelter of a reed-bed.

11. **Porphyrula martinica** (Linn.). ♀, 25 April, ovaries small. Irides garnet; apical half bill apple-green, rest sealing-wax red; anterior third of head-plate red, remainder smalt-blue; feet and toes chrome-yellow; claws yellow-horn. Small seeds in stomach. Not previously recorded from the Honduranian mainland.

12. **Eurypyga helias major** Hartlaub. ♂, 23 April, right testis greatly enlarged, other only slightly so. Irides red; eyelids yellow, edged brownish; inside mouth bright orange; extreme tip of maxilla orange-yellow, edges of commissure bright orange, rest black, becoming brown at base; mandible bright orange; feet and toes bright orange, front of tarsi and upper surface of toes brown-orange; claws yellow. Stomach contained a shrimp, 5.3 cm. long, and other smaller crustaceans. ♀, 23 April, ovaries greatly enlarged (an egg fully developed but lacking the shell). Irides red-orange; claws yellowish-horn; otherwise coloured like ♂. Stomach contained crabs. This species has not previously been recorded from Honduras. The two specimens, a mated pair, were taken below a waterfall in dense forest in the foothills about five miles inland from La Ceiba, at an altitude of some 400 feet. The female took refuge in a tree covered with vines. Two leeches were attached to one eyeball of the male. It is known to the natives as "garza montaña."

13. **Jacana spinosa spinosa** (Linn.). ♂, 25 April, testes enlarged. Irides dull olive; bill deep yellow, maxilla white at base; head-plate yellow, separated from bill by narrow band of violet-pink; skin at point of chin yellow-green; feet and toes grey-green; claws horny-brown; wing-spurs bright yellow. This bird is in a plumage intermediate between immature and adult.

14. **Squatarola squatarola** (Linn.). ♂, 31 March, testes small. Irides brown; bill black; rictus and inside mouth orange; feet and toes dark grey; claws black. Crustaceans in stomach. Not previously taken in Honduras.

15. **Charadrius hiaticula semipalmatus** Bonap. ♂, 11 April, testes small. Irides brown; eyering orange; maxilla black, bright orange at base; mandible black, basal half bright orange; feet and toes orange; claws black. Not previously recorded from Honduras.

16. **Charadrius collaris** Vieill. ♂, 31 March, testes enlarged. Irides brown; bill black; feet and toes flesh; claws black. Not previously recorded from Honduras.

17. **Arenaria interpres morinella** (Linn.). ♀♀, 12 April, ovaries small. Irides brown; apical half of bill dull black, rest very dark brown; feet and toes orange; claws black. Not previously recorded from Honduras.

18. **Catoptrophorus semipalmatus inornatus** (Brewster). ♂, 16 April, testes small. Irides brown; bill black, becoming plumbeous on basal half; feet and toes plumbeous; claws black. Wing: 204; Tail: 82.9; Culmen: 59; Tarsus: 64.5. ♀, 16 April, ovaries small. Colours as in the ♂. Wing: 207; Tail: 83; Culmen: 63.5; Tarsus: 65.5. Shot from a flock of five.

19. **Erolia melanotos** (Vieill.). ♂, 11 April, testes small. Irides dark brown; bill black, becoming dark yellow on basal half; feet and toes dark yellow; claws black. ♀, 11 April, ovaries small. Colours as in the ♂. This bird has not previously been recorded from Honduras.

20. **Erolia fuscicollis** (Vieill.). ♂, 18 April, testes small. Irides brown; maxilla black; mandible black, with basal half dark brown, lighter below; feet and toes blackish-brown; claws black. Not previously recorded from Honduras. One other was seen 24 April.

21. **Calidris canutus rufus** (Wilson). ♀, 12 April, ovaries small. Irides brown; bill brownish-black, olive at base mandible; feet and toes dark olive-yellow; claws black. Not previously recorded from Honduras.

22. **Limosa fedoa** (Linn.). ♂, 20 March, testes small. Irides brown; apical half bill black, rest livid-pink; feet and toes dark brown; claws black. Not previously recorded from Honduras. This was the only Godwit seen.

23. **Crocethia alba** (Pallas). ♀, 1 April, ovaries small. Irides brown; bill, feet, toes, and claws black. Not previously recorded from Honduras.

24. **Columbigallina rufipennis rufipennis** (Bonap.). ♀, 2 April, ovaries small. Irides pink; orbital skin grey; bill dark horny-brown; feet and toes fleshy-pink; claws horny-brown. Small seeds in crop. This Dove was very common everywhere in open country.

25. **Claravis pretiosa pretiosa** (Ferrari-Pérez). ♂, 14 April, testes greatly enlarged. Irides rose-pink; bill pale greenish, culmen horny-brown; feet and toes flesh; claws dull black. Crop contained seeds. This beautiful Dove was common locally. While some authors say this is a bird of heavy forest, both in Honduras and Panamá I have always found it feeding in roads bordered by bushes and thickets.

26. **Leptotila cassini cerviniventris** Sclater & Salvin. ♀, 8 April, ovaries enlarged. Irides cream; lores and orbital skin red; bill black; feet and toes red; claws horny-brown. Seeds in crop. A very common species in forest and tangled thickets.

27. **Coccyzus minor minor** (Gmelin). ♂, 29 March, testes small. Irides brown; eyelids plumbeous; eyering yellow; maxilla black; mandible yellow, deeper at base, tip and edges of commissure black; feet and toes olive-plumbeous; claws horny-black.

28. **Crotophaga sulcirostris sulcirostris** Swainson. ♀, 19 April, ovaries small. Irides brown; bill, feet, toes, and claws, black. Abundant except in the forest.

29. **Pionus senilis senilis** (Spix). ♂ ♂ ♂, 5 April, testes small. Irides brown; orbital skin dull brick-red; cere violet-pink; bill apple-green, yellow on sides at base, extreme tip and edges of commissure horn; feet and toes dull orange; claws dark horn. All had fruit in stomach. This species first appeared flying from the south on this date and thereafter was common in orchards and lightly wooded country.

30. **Pulsatrix perspicillata saturata** Ridgway. ♂, 13 April, testes small. Irides golden-yellow; eyelids dead-white; bill horny-yellow; cere horny; feet and toes yellow-horn; claws dull black, horn at base. Stomach contained insects. This Owl, the only one of its kind seen, was taken in dense woodland.

31. **Nyctidromus albicollis intercedens** Griscom. ♀, 12 April, ovaries enlarged. Irides dark brown; eyering fulvous; bill pinkish-brown, tipped brownish-black; feet and toes pinkish-grey; claws horny-brown. This specimen is in the rufescent phase of plumage. Pauraques were common in second-growth woodland.

32. **Amazilia tzacatl tzacatl** (De la Llave). ♂, 20 March, testes small. Irides brown; bill black, basal half of mandible and skin of chin orange; feet, toes, and claws black. An abundant species in open country.

33. **Trogon melanocephalus melanocephalus** Gould. ♂, 8 April, testes small. Irides brown; eyering smalt-blue; maxilla pale bluish; mandible plumbeous-blue, tipped pale bluish; feet and toes plumbeous-blue; claws dark horn. Stomach contained fruit. Probably common but difficult to distinguish from the closely related species *T. violaceus braccatus* (Cabanis & Heine). They are birds of the thickets and second-growth.

34. **Megaceryle torquata torquata** (Linn.). ♂, 21 March, testes small. Irides brown; bill black, horn at base maxilla and on basal half mandible; feet and toes olive-green; soles yellow; claws black. Numerous along the river.

35. **Chloroceryle ænea stictoptera** (Ridgway). ♀, 25 March, ovaries small. Irides brown; maxilla black, pale grey inside; mandible black, fleshy along keel below; feet brownish-grey, toes somewhat darker; claws horny-brown. Not uncommon in pairs at forest pools.

36. **Momotus lessoni lessoni** Lesson. ♂, 25 March, testes small. Irides red; bill black; feet, toes, and claws dark brown. ♀, 25 March, ovaries small. Coloured like the ♂. ♂, 2 April, testes small. Eyelids white, edged black; claws brownish-black; otherwise coloured as above. Seeds in stomach.

37. **Eumomota superciliosa euroaustris** Griscom. ♂, 14 April, testes small (right testis grey, other white). Irides brown; bill black; feet and toes brownish-black; claws dull black. This bird was shot from a high tree in open woodland, whereas the preceding species was found only in dry thickets.

38. **Ramphastos swainsoni** Gould. ♂, 25 February. (Taken at the junction of the Patuca and Yapuras rivers in eastern Honduras by Dr. W. D. Strong.) This record extends the range of this species northward; it has previously been taken only on the Segovia river, the present boundary between Honduras and Nicaragua.

39. **Ramphastos sulphuratus brevicarinatus** Gould. ♂, 23 April, testes small. Irides with very narrow violet-blue outer ring, rest olive-drab; lower eyelid violet-blue; upper eyelid, orbital region, and skin of front, apple-green, brilliant yellow above ears; apical quarter of maxilla blood-red, patch on sides orange, commissure

edged bright blue from posterior end of this patch to base, rest apple-green, more yellow on basal half culmen; apical quarter of mandible blood-red, half of remainder sky-blue, rest apple-green, edges of commissure orange excepting apical quarter; whole bill separated at base from head by a black band; inside maxilla light orange, becoming yellow toward throat; throat blue; inside mandible dull light olive-green; skin of chin greenish-yellow, blue at sides; naked skin inside tibiae and under wings, livid-flesh; feet and toes bright blue, fore part of tarsi slaty-blue; soles yellow; claws horny-black. Taken about five miles inland from La Ceiba, at an altitude of some 400 feet. The Toucans are known to the natives as "pico navaja."

40. **Pteroglossus torquatus torquatus** (Gmelin). ♀, 18 April, ovaries small. Irides bright yellow; eyelids buff, edged black; orbital skin blood-red, immediately around eye black; apical third maxilla black, middle third olive-grey, basal third yellow-brown, culmen black, teeth of basal two-thirds white with black patch inside each angle; mandible black; whole bill separated from head at base by white band and then by narrow greenish-grey band next to feathers (on sides of maxilla white band is narrowly edged red on side toward tip of bill); bare skin of throat livid-violet; feet and toes olive-green; claws horny-black, horny olive-green at base; soles bright yellow. Common in forest and more open woodland.

41. **Centurus aurifrons pauper** Ridgway. ♂, 27 March, testes greatly enlarged. Irides crimson; orbital skin light pinkish-brown; bill black; feet and toes olive-green; claws horny-slate. This Woodpecker is abundant except in heavy forest.

42. **Celeus castaneus** (Wagler). ♀, 16 April, ovaries small. Irides red; orbital skin slate; bill blue-white, bluish at base; feet and toes plumbeous-blue; claws dark horny-brown. Occurred locally at the edge of heavy forest.

43. **Ceophlœus lineatus similis** (Lesson). ♀, 1 April, ovaries small. Irides white; orbital skin brownish-grey; bill ivory-white; feet and toes plumbeous; claws horny-plumbeous. Stomach contained ant pupæ. Common in all woodland.

44. **Xiphorhynchus flavigaster flavigaster** Swainson. ♀, 27 March, ovaries enlarged. Irides brown; bill horny-white, horny-brown at base maxilla; feet and toes olive-green; claws horn. ♂, 16 April, testes enlarged. Colours of soft parts as above. ♂, 16 April, testes greatly enlarged. Colours of soft parts as above.

45. **Lepidocolaptes souleyetii insignis** (Nelson). ♂, 20 March, testes small. Irides brown; maxilla horn; mandible horny-flesh; feet and toes olive-green; claws horn-brown. Ants in stomach. ♀, 26 March, ovaries small. Maxilla horn-brown, becoming much darker brown at base; mandible horny-white; inside mouth yellow; otherwise coloured like ♂.

46. **Dendrocincla anabatina anabatina** Sclater. ♂, 5 April, testes greatly enlarged. Irides bright brown; orbital skin grey; maxilla dark horny-brown, extreme tip and edges of commissure horn; mandible plumbeous; feet and toes plumbeous-blue; claws dark horny-brown.

47. **Gymnopithys bicolor olivascens** (Ridgway). ♀, 8 April, ovaries small. Orbital region and skin of chin blue; maxilla black; mandible plumbeous-blue; feet and toes plumbeous-blue; claws plumbeous-blue on sides, edged horny-white at top and bottom.

48. **Platypsaris aglaiæ hypophæus** Ridgway. ♀, 24 March, ovaries small. Irides brown; maxilla black, extreme tip horn; mandible and rictus plumbeous-blue, extreme tip and edges of commissure horny-white; inside mouth orange; feet and toes plumbeous-blue; claws horny-black. ♀, 3 April, ovaries small. Soft parts coloured as above. ♂, 14 April, testes small. Soft parts coloured as above.

49. **Tityra semifasciata personata** Jard. & Selby. ♂, 23 March, testes greatly

enlarged. Irides orange-brown; orbital region, lores, rictus, inside mouth, and basal half bill rose-red; rest of bill black; feet and toes plumbeous-grey; claws slaty-black. Apparently nesting on this date in a hole in a dead tree.

50. **Sayornis nigricans aquatica** Sclater & Salvin. ♂, 27 April, testes enlarged. Irides brown; maxilla black; mandible blackish-brown, horny at base; rictus and inside mouth yellow; feet, toes, and claws black. ♀, 27 April, ovaries small. Soft parts coloured as in the ♂. The Black Phoebe has not previously been collected in Honduras and this locality is a considerable eastward extension of its range. It occurred along the river where it flows through dense forest, and seems to be rare and local, since only three individuals were seen during my six weeks' stay. These specimens are, as shown below, intermediate in size between *aquatica* and the Costa Rican *amnicola;* the white area of the abdomen is intermediate in extent between *aquatica* and *amnicola*, but not clearly defined as in the latter race; the under tail coverts are sooty edged white; the back of each is browner than in the corresponding sex of either *aquatica* or *amnicola*, though this may be due to wear. On the whole these specimens seem closer to *aquatica*, though a larger series taken throughout the year might show the Honduranian birds to be subspecifically separable.

	Wing	*Tail*	*Culmen*
Guatemala (*aquatica*) ♂♂♂	91.8	89	16.2
Honduras ♂	88.5	78.5	18.5
Costa Rica and Nicaragua (*amnicola*) ♂♂♂♂	85.2	74.9	15.5
Guatemala (*aquatica*) ♀♀♀	81.8	78	16.2
Honduras ♀	82	77	17.5
Costa Rica and Nicaragua (*amnicola*) ♀♀♀♀♀	83.2	72.9	14.1

51. **Myiodynastes luteiventris luteiventris** Sclater. ♂, 27 March, testes greatly enlarged. Irides brown; bill black, fleshy at base of mandible; feet and toes dark slate; claws black. ♂, 31 March, testes greatly enlarged. Soft parts coloured as above.

52. **Pitangus sulphuratus guatimalensis** (Lafresn.). ♂, 31 March, testes enlarged. Irides brown; bill black; feet and toes brownish-black; claws black. ♂, 20 April, testes enlarged. Soft parts coloured as above. The "bicho feo" was abundant everywhere except in heavy forest.

53. **Todirostrum cinereum finitimum** Bangs. ♀, 19 March, ovaries small. Irides creamy; maxilla black, plumbeous inside; mandible fleshy-white, edges of commissure black, fleshy inside; feet, toes, and claws plumbeous-blue. Stomach contained insects. Very common in all open country.

54. **Riparia riparia** (Linn.). ♂, 25 April, testes small. Irides brown; bill black; feet, toes, and claws brown.

55. **Hirundo rustica erythrogaster** Boddaert. ♂♂, 25 April, testes small. Irides brown; bill black; feet, toes, and claws brown.

56. **Psilorhinus mexicanus cyanogenys** Sharpe. ♂, 18 April, testes greatly enlarged. Irides brown; eyelids edged brownish-slate; maxilla black, extreme tip and edges of commissure on basal third yellow; extreme tip of mandible, edges of commissure on basal half, and basal two-thirds below (except for black central patch) yellow, rest black; feet, toes, and claws black; soles brownish-yellow. Common in small flocks in second-growth woodland.

57. **Pheugopedius maculipectus umbrinus** (Ridgway). ♂, 19 March, testes small. Irides bright brown; maxilla slaty; mandible plumbeous-blue; inside mouth

black; feet and toes plumbeous-blue; claws plumbeous-blue, horn at tips. Very common in hedgerows and thickets.

58. **Turdus grayi grayi** Bonap. ♀, 25 March, ovaries small. Irides bright brown; bill olive-green, commissure edged yellow; feet, toes, and claws fleshy-plumbeous. Very common everywhere except in heavy forest.

59. **Cyanerpes cyaneus cyaneus** (Linn.). ♂, 13 April, testes greatly enlarged. Irides brown; bill black; feet and toes red-orange.

60. **Gymnostinops montezuma** (Lesson). ♀, 23 March, ovaries small. Irides dull brown; orbital skin light blue; bare skin of front, chin, and throat pink; basal half bill black, rest bright orange; feet, toes, and claws brownish-black. Stomach contained fruit. Locally very common.

61. **Amblycercus holosericeus holosericeus** (Lichtenstein). ♂, 16 April, testes enlarged. Irides light yellow; bill yellowish-green; feet and toes plumbeous-blue; claws horny-blue. ♂, 27 April, testes enlarged. Bill greenish-yellow, tip translucent horny; feet and toes plumbeous; claws horny-plumbeous; otherwise coloured as above. Common in thickets.

62. **Dives dives** (Lichtenstein). ♀, 3 April, ovaries small. Irides brown; bill black; feet, toes, and claws brownish-black. ♀, 12 April, ovaries small. Soft parts coloured as above. An uncommon species found in large trees covered with vine-tangles.

63. **Thraupis abbas** (Lichtenstein). ♀, 20 April, ovaries enlarged. Irides brown. Not uncommon, but keeps to the tops of tall trees.

64. **Ramphocelus passerinii passerinii** Bonap. ♂, 4 April, testes greatly enlarged. Irides brown; bill smalt-blue, tip and edges of commissure black; feet and toes slate-blue; claws black. An abundant Tanager in open country.

65. **Phlogothraupis sanguinolenta sanguinolenta** (Lesson). ♀, 11 April, ovaries greatly enlarged. Irides red; bill light plumbeous-blue, becoming blue-white at base; feet, toes, and claws slaty-grey. Rather uncommon in second-growth woodland.

66. **Piranga rubra rubra** (Linn.). ♀, 3 April, ovaries small. Irides brown; maxilla horn-brown, commissure edged horny-yellow; mandible horny-yellow, commissure edged yellow; rictus yellow; feet and toes horny-violet; claws horny-brown.

67. **Saltator grandis grandis** (Lichtenstein). ♂, 16 April, testes greatly enlarged. Irides grey-brown; maxilla black; mandible dark brown, tipped black; feet, toes, and claws dark brown.

68. **Arremonops striaticeps richmondi** Ridgway. ♂, 2 April, testes enlarged. Irides orange; bill black, basal half mandible plumbeous-white below; feet and toes fleshy-horn; claws horn. ♂, 11 March. (Taken on the Patuca river in eastern Honduras by Dr. W. D. Strong.) Not uncommon in bushes and thickets along roads. *A. conirostris centratus* Bangs, described from La Ceiba, appears to be a synonym of *richmondi*.

U. S. National Museum,
Washington, D. C.

THE BAR-TAILED GODWIT AND ITS RACES.[1]

BY LEONIDAS PARTENKO.

IN studying the zoogeographic relationship between the Chukchi Peninsula and Alaska I attempted to determine the exact limits of distribution of certain birds regularly breeding there. As a partial result of these studies is given the following revision of the races of the Bar-tailed Godwit which may not be without interest to ornithologists both of the Old World and the New.

The greater part of the material upon which this paper is based is to be found in the Zoological Institute of the Academy of Sciences of the USSR. A smaller portion was borrowed from the Moscow Zoological Museum and from Darwin's Museum. For the use of this material I tender my thanks to all of the institutions concerned. I have also had before me some specimens from the Arctic Institute. The total number of skins examined amounts to over two hundred and twenty.

Two races of *Limosa lapponica* have hitherto been recognized; one from the western part of the Palaearctic and another, larger race, with a more spotted rump, from eastern Siberia and western Alaska. A careful study of the above series of skins leads me to the conclusion that there exist at least three geographical races, one of which is undescribed. Its description and comparison with the already known forms is herewith presented.

1. **Limosa lapponica lapponica** (Linnaeus).

General color of the lower back and rump pure white, or with a few brown lanceolate shaft streaks which are concentrated along the middle line of the rump and disappear toward the sides. The under wing-coverts are pure white or with shaft streaks or sometimes small spots. At first glance the white color seems to prevail. The transverse brown bars on the axillaries are narrower than the white bars, and are intermingled checker-wise. The feathers of the rump, under wing-coverts and axillaries are less spotted in the males (sometimes with none) than in the females. Compared with the other two races this one differs in having the wing and bill shorter but I find no appreciable difference in the length of the tarsus.

It breeds in the tundra zone and in the so-called forest-tundra zone of Europe and northwestern Siberia from Kola Peninsula to the Khatangse River. Taimyr birds show tendencies toward the next subspecies but notwithstanding this the axillaries always have narrower brown, not white, bars.

[1] Contribution from the Arctic Institute of the USSR, Leningrad.

2. **Limosa lapponica menzbieri** new subspecies.

Type. Male adult, Ruskaye Ustye (Russian Mouth) in the Indigirsa delta, June 9, 1930 collected by N. Michel.

Co-type. Female, adult, with the same data; both on the collection of the Zoological Institute, Leningrad.

Type locality. Indigirsa Mouth.

Lower back and rump more closely and proportionately spotted, showing traces of transverse bars. Separate feathers with angular or arrow-shaped brown spots, increasing towards the base but always retaining the central white patch. Under wing-coverts spotted approximately as in *baueri*. The axillaries are barred angularly with brown and white in nearly equal proportion, i. e. the brown transverse bars equal in width to the white ones or the latter slightly narrower. Therefore the general tone of coloring of the under wing seems to be darker than in *lapponica* and whiter than in *baueri*.

In measurements this race is distinctly larger than *lapponica* and nearly as large as *baueri*.

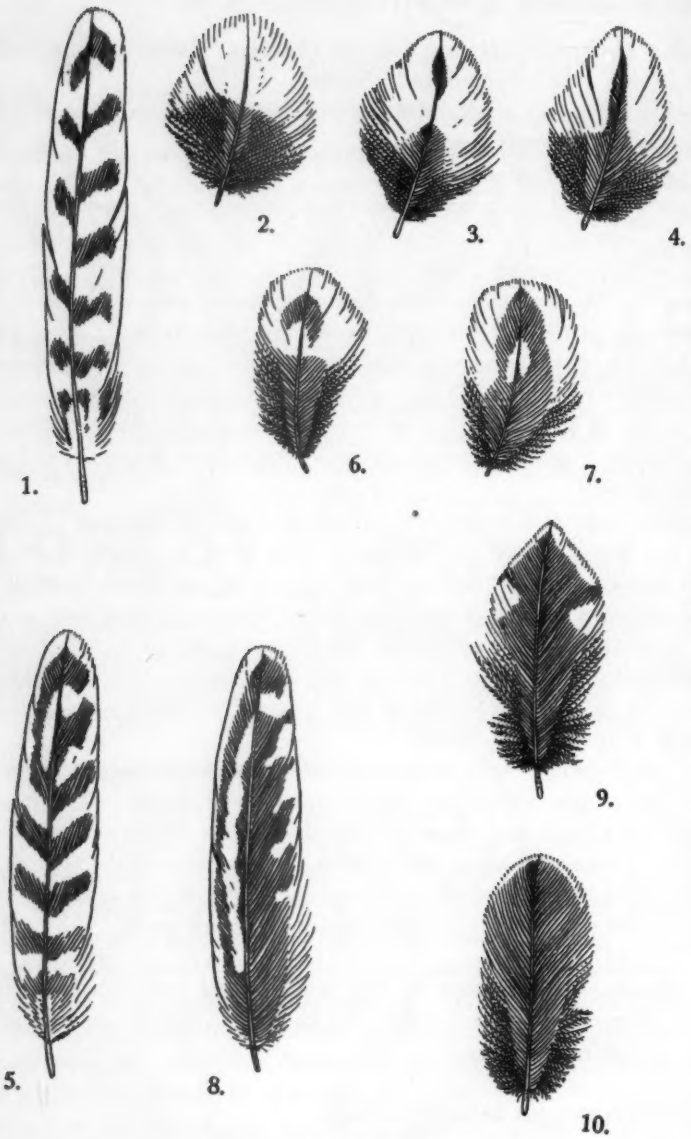
In some respects this race occupies an intermediate position between the other two but it should not be classed with those intermediate specimens which usually exist on the boundary between two geographic races.[1] Certain extremes of individual variation are represented by birds from a definite and large territory, consequently they permit us to correlate definite characteristics with a particular geographical region. We may add that intergrades independently exist as well between *menzbieri* and *lapponica* as between *menzbieri* and *baueri*.

The true breeding range of this subspecies extends at least from the Lena River east to the western portion of the Anadyr region. It is found on Lyakhovski Island and migrants were shot on the shores of Anadyr Bay, on the Commander Islands, Kamchatka, on the shores of the Okhotsk Sea, Shantar Islands, Sakhalin and in Ussuri-land. An immature specimen with all the characteristics of this subspecies was secured on the Taimyr Peninsula.

In choosing a designation for this well marked new form of Godwit I wish to perpetuate in nomenclature the name of my dead teacher, Professor M. A. Menzbier of Moscow.

3. **Limosa lapponica baueri** Naumann.

Upper portion of the lower back almost uniformly dark colored, individual feathers are pale brown, fringed with white. The short tail coverts are spotted with white at their tips on both webs (as figured in our illustration) but never with a central white patch. Under side of wings very dark. The axillaries possess very broad brown bars which sometimes have a tendency



Axillaries and Breast Feathers.

1–4. *L. l. lapponica.* 5–7. *L. l. menzbieri.* 8–10. *L. l. baueri.*

to acquire a longitudinal direction or to form a knotty pattern. Females have more white on the axillaries than males, at least the specimens examined so indicate.

In measurements this race is nearly identical with the preceding.

This bird belongs to the coasts of Bering Sea and adjacent regions. Specimens have been obtained in the eastern portion of the Anadyr region but it remains unknown whether it breeds there or is only a migrant. It certainly does breed in the eastern part of the Chukchi Peninsula. The great number of specimens on migration on Bering Island lead one to suppose that it breeds on the Commander Islands. In the Museum of the Academy of Sciences in Leningrad the American Bar-tailed Godwit is represented by a number of specimens collected by E. H. Woznessensky in the former Russian possessions in Alaska during the years 1843 and 1844: Norton Sound, July 9, 1843, female; St. Paul Island (Pribilofs), without detailed data in 1844, three males and three females; Atka Island (Aleutians) female; Sitka male; and Wrangell (Southeast Alaska) female. Migrant specimens have been procured as already mentioned on Bering Island, Kamchatka, Sakhalin, in Japan and Ussuri-land, and wintering specimens in Australia.

With regard to the ecology of this race according to our knowledge of its breeding range it may be surmised that *Limosa lapponica baueri* in its habits and peculiarities of habitat differs strongly from the allied forms *L. l. lapponica* and *L. l. menzbieri* being mainly a maritime bird.

The races of the Bar-tailed Godwit according to our analysis of the material at hand now stand as follows, listing them from west to east:

1. *Limosa lapponica lapponica* (Linn.) Bar-tailed Godwit.
   Breeds from the Atlantic to the Khatanga River.
2. *Limosa lapponica menzbieri* Portenko. Menzbier's Godwit.
   Breeds from the Lena River to the Anadyr region.
3. *Limosa lapponica baueri* Naumann. Pacific Godwit.
   Breeds on the coasts of Bering Sea.

MEASUREMENTS: MALES.

	Culmen	*Wing*
L. l. lapponica	29 spec. 76.7 mm. (68.0–84.3)	31 spec. 205.8 (197.2–218.2)
L. l. menzbieri	8 spec. 83.7 mm. (79.9–86.4)	8 spec. 213.9 (209.1–223.0)
L. l. baueri	16 spec. 80.7 mm. (70.3–89.3)	16 spec. 215.8 (205.5–230.4)

MEASUREMENTS: FEMALES.

L. l. lapponica	33 spec. 97.2 mm. (88.8–110.4)	34 spec. 216.5 (208.9–231.7)
L. l. menzbieri	9 spec. 105.8 mm. (95.3–110.0)	11 spec. 225.4 (218.0–239.0)
L. l. baueri	17 spec. 107.0 mm. (88.3–118.8)	17 spec. 233.2 (223.5–249.3)

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German, Miss Ann, East Islip, Long Island, N. Y.
Graff, Miss Audre, 929 Yale Ave., Fresno, Calif.
Grass, Arthur Merritt, 339 B St., N. E., Linton, Ind., (1927–30).
Groskin, Horace, 220 St. Georges Road, Ardmore, Pa.
Gunn, W. W. H., 6 Dunloe Road, Toronto, Ont.
Hagar, J. A., Marshfield Hills, Mass.
Hambleton, James Chase, 380 W. 8th Ave., Columbus, Ohio.
Harris, Dr. Arthur Trevenning, 504 Broadway, Gary, Ind.
Heggeness, H. Gordon, 1111 8th St., No., Fargo, N. Dak.
Hendricks, George Bartlett, 115 Wendell Ave., Pittsfield, Mass.
Hinds, Frank J., Dept. Biol., Western State Teachers College, Kalamazoo, Mich.
Hotchkiss, Neil, Biological Survey, Washington, D. C.
Howells, Mrs. Gertrude, Pres. Mesilla Valley Acad. Soc., State College, N. Mex.
Hoyt, John Southgate Yeston, 206 Washington St., Lexington, Va.
Hurlbut, William Ellis, Vineland, Ont.

HYDE, LATIMER B., 100 Church St., Ware, Mass.
JESSMAN, MISS LENA M., 4168 W. Jefferson St., Ecorse, Mich.
JOHNSON, MURRAY LEATHERS, 4102 N. 38th St., Tacoma, Wash.
JONES, HAROLD ROBERT, 317 New York St., Scranton, Pa.
KAY, LAMBDIN, 2332 Delwood Drive, N. W., Atlanta, Ga.
KEARNS, WILLIAM EUGENE, Box 51, Yellowstone Park, Wyo.
KENNEDY, HOMER NEY, Box 294, Rosslyn, Va. (1924–31)
KINGSLEY, MISS WINIFRED, Linden Hall, Lititz, Pa.
KNECHTEL, GERALD WILLIAM, 33 Ahrens St., West, Kitchener, Ont.
KUSCHE, ARTHUR WYNDHAM, JR., 181 North Franklin St., Wilkesbarre, Pa.
LANG, EDWARD BALDWIN, 156 Joralemon St., Belleville, N. J.
LAUCKHART, J. BURTON, R. F. D. 1, Lynden, Wash.
LEES, WILLIAM ANDREW DICKSON, Box 138, Wetaskiwin, Alta., Can.
LEMON, EARL, West Lorne, Ont.
LEWIS, NORMAN, R. F. D. 1, Glens Falls, N. Y.
LOBODA, LOUIS ANTHONY, Box 135, New Lisbon, Wis.
LOFSTROM, LAWRENCE LEVI, Cambridge, Minn.
LONG, GEORGE BAKER, 56 Hawes St., Brookline, Mass.
LONG, WILBUR STUART, Springdale, Utah.
LUNN, WILLIAM HERBERT, Hillier, Ont.
MAGUIRE, WALTER STANLEY, Y. M. C. A., New Westminster, B. C.
MAINSTER, RAYMOND WAITE, Sylvan Drive, Woodlawn, Baltimore Co., Md.
MANGELS, FREDERICK PAUL, 323 Wilson Ave., Bellmore, N. Y.
MANSELL, WILLIAM CHARLES, 62 Baby Point Crescent, Toronto, Ont.
MARSHALL, WILLIAM HAMPTON, Biological Survey, Washington, D. C.
MASLOWSKI, KARL HERBERT, 950 Glenwood Ave., Cincinnati, Ohio.
MCDONALD, NORMAN JOHN, Media, Pa.
MCLENNAN, JAMES PIRRIE, Box 143, Ossining, N. Y.
MCMASTER, MRS. WILLIAM DAVID, 1030 S. State St., Belvidere, Ill.
MERRY, MISS KATHERINE, 268 Auburn Ave., Pontiac, Mich.
MEANLEY, MORTIMER BROOKE, 5111 Roland Ave., Roland Park, Baltimore, Md.
MILLER, HOWARD BURNETT, 4 High St., Turner's Falls, Mass.
MILLER, ROBERT CUNNINGHAM, Dept. Zool., Univ. Wash., Seattle, Wash.
MOLONY, CHARLES EDMUND GIBSON, 3 Elm Ave., Toronto, Ont.
MONROE, BURT LEAVELLE, 110 S. 5th St., Louisville, Ky.
MOORE, FREDERICK, JR., 1920 Vail Ave., Charlotte, N. C.
MOWAT, FARLEY, Public Library, Saskatoon, Sask., Can.
MYRUS, ADOLPHE A., 81 Ford Ave., Oneonta, N. Y.
NELLES, ARTHUR, 223 McLeod St., Ottawa, Ont.
NIEDRACH, ROBERT JAMES, Colo. Mus. Nat. Hist., Denver, Colo.
NOLAN, THOMAS BRENNAN, U. S. Geological Survey, Washington, D. C.
NORTH, GEORGE WEBSTER, 249 Charlton St., West, Hamilton, Ont.
OLIVIER, GEORGES, 6 Rue Chas. Flavigny, Elbeuf, Seine Inferieure, France.
PACKARD, FRED MALLERY, 181 High St., Passaic, N. J.
PATTERSON, THOMAS DORRINGTON, 562 Waterloo St., London, Ont.
PERKINS, IRVING JAMES, Public Museum, Milwaukee, Wis.
POLAND, JAMES LLOYD, 526 W. Burke St., Martinsburg, W. Va.
RAPRAEGER, ELMER FREDERICK, No. Rocky Mt. For. Exp. Sta., Missoula, Mont.
RICHARDSON, FRANK, 3616 Main St., Riverside, Calif.
RICHARDSON, DR. LAURENCE ROBERT, Dept. Zool., McGill Univ., Montreal, Can.

RIDEOUT, MISS ANNIE LILLIAN, 15 Farragut Road, Swampscott, Mass.
ROBINSON, CHARLES BONNYCASTLE, JR., Georges Mills, N. H.
ROCKEFELLER, J. S., 791 Park Ave., New York, N. Y.
ROGERS, PROF. WALTER E., 911 E. North St., Appleton, Wis.
ROSS, DOUGLAS ALEXANDER, Vineland Station, Ont.
ROUSE, REGINALD FREDERICK, 105 New St., Birmingham, England.
SAUNDERS, RICHARD MERRILL, 17 Elgin Ave., Toronto, Ont.
SCHEUCK, MISS KATHRYN ALDEN, 4451 Main St., Snyder, N. Y.
SCOTT, DAVID MAXWELL, 279 Briarhill Ave., Toronto, Ont.
SHELTON, A(LFRED) C(OOPER), Suite 1, 234 Mass. Ave., Arlington, Mass.
SHERMAN, MISS ALICE E(LIZABETH), 1144 Kenmore Ave., Buffalo, N. Y.
SHIPLEY, MISS SYLVIA ANN, The Shipley School, Bryn Mawr, Pa.
SHORTT, ANGUS HENRY, Man. Museum, Auditorium Bldg., Winnipeg, Man.
SMITH, GEORGE SCOTT, Care M. B. Whyte, R. R. No. 2, Napanee, Ont.
SNOW, MRS. CHESTER, 6805 Brookville Road, Chevy Chase, Md.
SPEIRS, JOHN MURRAY, 17 Wolfrey Ave., Toronto 6, Ont.
STAEBLER, ARTHUR EUGENE, Route 5, Box 252, Ann Arbor, Mich.
STARR, DR. FREDERIC ALBERT EVANS, 10 Elm St. E., Sudbury, Ont.
STEELE, RAY CALDWELL, Winona, Minn.
STILLWELL, WENDELL W., 406 East Vine St., Mt. Vernon, Ohio.
STORER, ROBERT WINTHROP, 21 S. West College, Princeton, N. J.
SUTHERLAND, EARL LLOYD, Keuka Park, N. Y.
TAYLOR, MRS. LOUIS ROBERTS, 926 East Kilbourn Ave., Milwaukee, Wis.
THOMAS, MRS. ROWLAND, Route 4, North Little Rock, Ark.
THOMPSON, STUART LOGAN, 286 Wychwood Ave., Toronto, Ont.
THORP, GEORGE BOULTON, Carnegie Inst. Technology, Pittsburgh, Pa.
TONER, GEORGE CLIVE, Gananoque, Ont.
TOUSEY, MISS KATHARINE, 22 Grand View Ave., Somerville, Mass.
TOUT, WILSON, North Platte, Nebr.
TRINE, MRS. GEORGE WASHINGTON, Red Cloud, Nebr.
TRUITT, CLARENCE FRANK, 327 N. First St., Yakima, Wash.
TUCKER, BERNARD WILLIAM, 9 Marston Ferry Road, Oxford, England.
ULRICH, EDWARD CARL, 275 Mulberry St., Buffalo, N. Y.
VAUGHN, WILLIAM COLEMAN, 591 Ashland Ave., Buffalo, N. Y.
VOGEL, HOWARD H., JR., Bowdoin College, Brunswick, Me.
WALLACE, GEORGE JOHN, Dept. Zool., Univ. Mich., Ann Arbor, Mich.
WALLACE, ROBERT BROWNE, Apt. 200H, Wardman Park Hotel, Washington, D. C.
WELCH, CECIL MELVIN, Polytechnic Institute, Polytechnic, Mont.
WOOD, MRS. WILLIAM L., Long Beach, Wash.
WOODRING, GEORGE B., Am. Nat. Bank, Hillsboro Br., Nashville, Tenn.
WOODWARD, ARTHUR JASON, 504 Kahkwa Blvd., Erie, Pa.
WYCKOFF, NATHANIEL CAIN, R. D. 3, Newfield, N. Y.
YEARLEY, CHURCH, Alpha Delta Phi Frat., 136 W. 44th St., New York, N. Y.
ZAHNISER, HOWARD, 3027 Newark St. N. W., Washington, D. C.

GENERAL NOTES.

Red-throated Loon and Holboell's Grebe in West Virginia.—Since West Virginia has no natural lakes or ponds, bird students in the state have been watching with great interest the effect that the construction of a series of power dams might have on water-bird life. It is gratifying to note that these artificially created lakes are being visited by annually increasing numbers of water-fowl.

Just outside of Morgantown the Cheat River has been dammed, making a narrow mountain lake about sixteen miles in length. A group from West Virginia University consisting of Karl Haller, James Handlan, R. H. Waldron, Jr., A. S. Margolin, and the writer has been visiting this lake regularly this past year. Among the birds noted have been Red-throated Loon (*Gavia stellata*) and Holboell's Grebe (*Colymbus grisegna holboelli*), two species for which state records are very scarce.

On November 20, 1935, two Red-throated Loons were carefully identified, and a third individual, presumably of this species, but too far away to make identification certain, was seen. It happened that several Common Loons were on the lake at the time, thus making comparison easy. We found that by driving from one side of the narrow lake to the other, following the movement of the birds, we secured a number of close observations, one of them from a distance of not over thirty feet. The very much whiter appearance of these birds as compared with Common Loons, and the apparently upturned bill were points of identification noted.

Bibbee has recorded this species from Lake Terra Alta, Preston County, and A. S. Morgan has taken a specimen in Putnam County. These are, so far as the author is aware, the only previous state records.

A single Holboell's Grebe was carefully identified near Rockley, on Cheat Lake, November 13, 1935. Here also we had a splendid basis for comparison, for there were Horned Grebes on the lake at the same time. The crescent white mark on the head was noted. Bibbee, Weimer, Walron, and a few others have previous state records for this species.

Other species of water-fowl noted during the autumn migration on this body of water were Horned Grebe, Pied-billed Grebe, Common Loon, Red-breasted Merganser, Scaup Ducks (sp.) and Bufflehead. MAURICE BROOKS, *West Virginia University, Morgantown, W. Va.*

Nest-building Instinct in an Immature Double-crested Cormorant (Phalacrocorax auritus auritus).—In connection with my recent studies on the home-life of the Double-crested Cormorant,[1] an unusual nesting condition was noted in one of the Maine colonies. An immature bird, believed to be a male, had established territory and was engaged in nest-building when observed on July 11, 1935. At this time only the foundation had been constructed, and I estimated that the bird had actually been occupied in carrying material about two days. Working at irregular intervals, the Cormorant completed the nest on July 17. Throughout this process, he was greatly hindered by the fact that each time he left his territory, a certain amount of nesting material was stolen by the other members of the colony. Nest-robbing of this type appears to be a common characteristic of the species, as I have observed it in four of the Maine colonies, and Lewis has commented upon it among the birds of the Gulf of St. Lawrence.[2]

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[1] These investigations were made possible by grants from the Coe Research Fund of the University of Maine.

[2] Lewis, H. F. The Natural History of the Double-crested Cormorant. 1929, Ru-Mi-Lou Books, Ottawa. Pp. 32–33.

Having completed the nest, the Cormorant guarded it jealously, and was as particular of his territorial rights as were the mature adults around him. The bird went through many of the true courtship maneuvers whenever a female flew overhead or walked by the nest. Rotation of the neck, elevation of the mandibles until they were perpendicular, and raising of the wings were all frequently observed, these acts being part of the normal display of the species. Song, and its accompanying physical contortions, were not witnessed. Incidentally, courtship among the other birds had been concluded for some little time, except for an occasional outburst of song.

The Cormorant remained on the nest constantly, except when feeding, until July 21. On that day, during a rather extended absence, his nest was almost entirely destroyed by neighboring adults. Although his premature nesting instinct had subsided to such a degree that he did not re-build, the bird never-the-less used his territory as a roosting place for two more days.

This incident is unusual, not only in itself, but because of the fact that among all the colonies which I have visited, immature Cormorants are not tolerated by the nesting birds. HOWARD L. MENDALL, *Dept. of Zoology, University of Maine, Orono, Maine.*

An Unusual Feeding Habit of the Snowy Heron.—On January 15, 1936, Mr. Robert P. Allen of the National Association Audubon Societies and the writer watched a group of Snowy Herons (*Egretta thula thula*) feeding from the Tamiami Trail, Collier Co., Florida, in a manner that was strange to both of us, and one which seems to be omitted completely in the literature.

The writer has been familiar with this species for many years in South Carolina, Georgia and Florida but never noted this performance before. The birds were in a small pond surrounded by heavy grass growth and their actions were almost those of a band of Petrels! Suddenly rising from the shallows, many would fly out over the pond, patting the water with their feet and flapping the wings quickly, making quick darts downward with the bill into the water. When first seen, it was thought to be an individual quirk of a single bird, but it soon became evident that it was not that. Nearly all of the score or more of birds present indulged in it from time to time and on occasions, half a dozen were at it at once. It was a rapid, hovering flight, close to the surface, with the feet in action as well as the wings, and reminiscent of nothing but a Petrel. It was not possible to see what was taken by the strikes of the bill, but it is likely that the birds were catching small shrimp, one of the fresh-water varieties.

The rapid actions of the species in feeding has often been commented upon, but hitherto always while the bird was wading, or walking about. I have examined the literature as best I can, and find no mention of the hovering flight, though it is possible that someone has noted it.—ALEXANDER SPRUNT, JR., *Supervisor Southern Sanctuaries National Asso. Audubon Societies, Charleston, S. C.*

The Roseate Spoonbill in Georgia.—The writer, through the courtesy of Mrs. Victor Bassett, of Savannah, Ga., takes pleasure in recording the occurrence of *Ajaia ajaja* in Georgia after a lapse of many years. During the summer of 1934, both Mrs. Bassett and Mrs. H. W. Butler of Chatham County, observed a specimen of this species in a Heron rookery situated in what is known as King's Pond, Lincoln County. Both ladies were sure of their identification but as sight records are not specimens, this occurrence did not perhaps, receive the merit it deserved. In July 1934, Mrs. Butler, while in King's Pond with a small kodak, saw the bird again and

photographed it. The image on the print is very small but absolutely characteristic. The bird is on a high, dead tree and the pose is unmistakable. The picture was sent to the writer by Mrs. Bassett.

Upon inquiry for recent records to Messrs. Eugene Murphey of Augusta, Ga., and Arthur H. Howell of the Biological Survey, the writer received news from Dr. Murphey that he knew of no record of the Spoonbill since 1869. Mr. Howell wrote as follows: "the Roseate Spoonbill apparently occurs in Georgia only as a rare and accidental visitor. Hoxie reported one at Savannah in the fall of 1911 (details lacking). Wright and Harper, in 'The Auk' for 1913, p. 503, mention finding feathers of this species in the Okeefinokee Swamp."—ALEXANDER SPRUNT, JR., *R.F.D. 1, Charleston, S. C.*

The Whistling Swan in South Carolina.—On January 22, 1936, Messrs. Edward M. Moore, Robert P. Allen and the writer saw a specimen of *Cygnus columbianus* in House Pond, Bull's Island, a part of the Cape Romain Federal Migratory Bird Refuge, S. C. It was an immature bird, and had been seen for some days previously on Caper's Island, just to the south, by Mr. E. K. Moore.

The bird appeared to be rather lethargic and allowed close approach. Maneuvering in a duck boat, the writer secured two pictures at about thirty feet, and the Swan took flight at even closer range, when another exposure was secured. It was seen to close its eyes several times while being watched, and occasionally emitted a low, whining note. Other than the visitation along this coast in late 1932, when Swans were seen on several plantations (Auk, vol. L, p. 208), this is the only record since 1917 when a single bird was seen near Mt. Pleasant by the late Arthur T. Wayne. It is an excessively rare bird on the South Carolina coast. The flight was strong and well sustained when the bird finally arose from the water.—ALEXANDER SPRUNT, JR., *R.F.D. 1, Charleston, S. C.*

The Whistling Swan in Connecticut.—On November 5, 1935, while I was watching water birds at the Penfield Reef, Fairfield, Conn., a flock of nine Whistling Swans (*Cygnus columbianus*) flew by. The birds were not high up, and according to my judgment, only about 250 feet away from me at the nearest point. The shape of the heads and bills could be made out easily to determine that the birds were not Mute Swans.

The call of the birds first attracted my attention to them. The sounds consisted of several short notes, not very loud, on two different pitches, about a major third apart. I determined the pitches to be F♯ and A♯ in the third octave above middle C. The quality suggested that of a reed instrument such as a clarinet or oboe.

This was at about 8.30 in the morning when the tide, though receding, was still fairly high. Several hours later, the same day, when the tide was low, I was on a beach in Milford, just east of the mouth of the Housatonic River. Five more Whistling Swans were standing on a sand flat, far out from the shore, and this time I used a telescope of 20x to identify them. Their long necks were stretched up almost straight, and the Herring Gulls near them looked like pygmies in comparison.—ARETAS A. SAUNDERS, *Fairfield, Conn.*

The Blue and the Lesser Snow Goose at Niagara Falls.—During the period October 26 to 31, 1935, the Niagara River area was favored by a remarkable, and apparently unprecedented visitation of large flocks of Blue Geese (*Chen caerulescens*), accompanied by a sprinkling of Lesser Snow Geese (*Chen h. hyperborea*).

This visitation of such unusually large numbers of migratory waterfowl naturally

called forth an equally unusual amount of publicity, and for a day or two such startling headlines as "Myriads of Wild Geese Battling Against Death Above Falls at Niagara," "Hundreds of Wild Geese Killed in Niagara in Losing Fight with River," "Airplanes to roar over Niagara to Scare Birds Off" etc., followed by long accounts of the occurrence in all its aspects, appeared in various newspapers, over a wide area.

From these newspaper accounts, from personal observations, and from numerous inquiries among friends and other eye-witnesses, we have sifted the following information which we believe to represent the true facts of this most interesting visitation of two species of Geese, which previously could only be considered as the rarest of stragglers to the Niagara district.

The Niagara River episode would appear to have started at Fort Erie for we have it on the authority of several Canadian Customs officers at that point that the river area near Fort Erie seemed to be full of Geese on the night of October 26–27 and that many of the inhabitants of the town were kept awake nearly all night by the noise of the flocks as they apparently passed down the river.

At daybreak on the 27th the birds were found in an immense flock, variously estimated at from 4,000 to 10,000, resting on the water among the swift currents, a short distance below the village of Chippawa on the Canadian side of the river. All day long, on Sunday, October 27, this large flock, described by one local eye-witness, Mr. J. H. Rasmussen, as a long ribbon of birds nearly as wide as the adjacent park boulevard, was watched by many people as it rode the swift but smooth currents to the edge of the rapids, where on reaching the rushing curving waters, rank on rank in rapid succession would leap into the air and fly back half a mile or more up the river only to join on to the tail of the column and repeat the performance in a seemingly endless round. Mr. Rasmussen informed us that the Geese when drifting down the river were all facing toward the falls, and that they apparently made no attempt to turn and rise from the water until they reached the first white-capped wave of the rapids. This same eye-witness informed us that during the hour in which he watched the flock on Sunday afternoon, he only saw one bird fail to rise at the edge of the rough water. This bird was carried over the first whitecap and quickly disappeared in the foaming waters of the rapids.

The biggest mortality undoubtedly occurred during the night when many of the birds paid the penalty of their dangerous game with Niagara's currents. These birds, doubtless becoming confused by mist, or the glare of the powerful searchlights on the falls, failed to take wing as they approached the edge of the rapids and being drawn into the rough water found themselves unable to rise, and were consequently carried down through the swirling rushing waters and over the Horseshoe Falls. Such birds, to the number of 200 or more, were later fished out of the water below the falls by men, boys and dogs. One man, William Hill, with his two sons, spending all night in a boat in the river below the Horseshoe Falls, obtained 47 Blue Geese from among the casualties.

The majority of the Geese going over the falls were found to be dead when retrieved from the lower river, but about twenty-five to thirty of the birds were rescued alive, and these under the direction of Sgt. T. Corliss of the Royal Canadian Mounted Police were placed in the care of Mr. J. E. Calvert on the Larkin farms at Queenston. One of these live birds was an immature Lesser Snow Goose, the others were apparently all Blues, both young and adult, being represented. Nearly all day on Monday, October 28, Geese were being fished out of the lower river from all along the banks as far down as the Whirlpool.

One lone bird, a white-headed adult Blue Goose was observed resting on a rock

jutting out into the water on the U.S.A. side of the river between the Upper and the Lower International bridges. This bird was being shot at by an unseen marksman, but in spite of the bullets hitting the water within a few feet of it, the bird refused to move, being apparently too exhausted to take wing after its unequal struggle with Niagara's falls and rapids.

All of the casualties personally examined, both live and dead birds, with the exception of the previously mentioned immature Lesser Snow, were Blue Geese (*Chen caerulescens*). Other varieties were reported by several people as occurring in the river at this time, but there would appear to be no definite evidence to prove the presence in the river of any other species beyond the two mentioned.

Early in the morning of October 28, the large flock of Geese in the Upper River moved over toward the shallows and reefs south of Goat Island, N. Y.; while during the greater part of that day numerous small flocks broke away from the main body and departed; many of these in a northwesterly direction over Canadian territory, and apparently toward the western end of Lake Ontario. On the same day, Mr. J. E. Calvert of Queenston informed me that he had, that afternoon, seen large numbers of Geese near the mouth of the river at Niagara-on-the-Lake.

On October 29, the writer saw a flock of about forty Geese drifting slowly down the river from the vicinity of Navy Island toward the Goat Island shallows: This flock was joined by two small parties, of seven and five birds respectively, which were first seen flying from the west over Canadian territory toward the river. This combined flock of fifty or more birds was carefully observed through 8x glasses. Three were adult Snow Geese and the balance were undoubtedly Blues. In addition to the small flock, great numbers of what appeared to be Geese were noted at this time in the shallow waters far south of Goat Island, but the distance was too great for definite distinction, even with the aid of glasses.

By noon on October 31, after the morning mists had cleared away, there were no signs of Geese in the Upper Niagara River, but about 10.30 a.m., while mists were still somewhat thick, Geese, apparently Blues and Snows, in some numbers, were heard passing over down-town Niagara Falls, Ontario.

In addition to the foregoing observations, the following information supplied by various local eye-witnesses would appear to be of distinct interest. Perhaps one of the most interesting of these was an account given to us by Major R. W. S. Fordham, Mr. Howard Fox and Mr. George Allen of Niagara Falls, who state that on Sunday morning Oct. 27, while at the Niagara Falls Riding Club, situated on the river boulevard about two miles above Navy Island, they watched a small flock of Geese, variously estimated at from thirty to fifty birds, grazing in an oat stubble field about a quarter of a mile from the river bank. This flock, believed from their descriptions to contain a large percentage of adult Blue Geese, remained in the vicinity feeding and flying around at intervals for a period of from two to three hours, and although when feeding they appeared to have a sentinel, the birds were exceedingly tame, and the horsemen were allowed a very close approach.

Referring again to the large flock of birds observed in the upper river on Sunday, October 27, eye-witnesses are at some variance in their estimate of the numbers of Geese resting on the river at this time. Mr. Roy Muma, local game warden, estimated that there were not less than 10,000 birds, 5% of which appeared to be adult Snow Geese, contained in the long ribbon of birds, thirty feet wide, and stretching a half mile up the river from the beginning of the upper rapids. This estimate is closely agreed to by Chief C. Bradley of the Queen Victoria Park Police who states that the big flock, for a time, was only about 300 yards out from the Canadian shore.

Other observers have given us estimates which varied from 4,000 minimum to 25,000 maximum. Personally we are inclined to believe that the true figures lie somewhere between 5,000 and 10,000, of which numbers some 200 to 250 met their death by going over Niagara's cataract.

Notwithstanding a great deal of speculation and discussion on the part of local eye-witnesses, newspaper correspondents, and others, regarding the possibility of scaring the birds away from the vicinity of the dangerous waters of the Niagara, nothing effective was done, because nothing apparently worth while could be done to get the birds away from the treacherous waters. Very fortunately a suggestion by someone to use the powerful illuminating lights at the falls to scare the birds away from the rapids was not acted upon for we have it on the authority of Mr. William Rapelje, chief operator of the lights, that they did not depart from their usual procedure on the night in question. He is of the opinion, which we heartily endorse, that any special playing of the lights on the upper rapids would have acted as a further fatal source of attraction, and confusion, to the already bewildered birds. —R. W. Sheppard, *1805 Mouland Avenue, Niagara Falls, Ontario.*

Blue and Lesser Snow Geese Near Vineland, Ontario.—Although wild Geese had been seen and reported, in this region, for a couple of days previously, they were not observed in exceedingly large numbers until the morning of October 28, 1935. when Mrs. Gerald Nicklin, the wife of the postmaster at Jordan Harbour, telephoned me, about 8.15 a.m., to ask me to come to the lake immediately, if I wished to see thousands of Geese.

No time was lost in getting to the scene of action—about four miles from my home. In the lake, about half or three quarters of a mile from the shore, was a great flock of wild Geese, appearing like a long seething black line on the water. Before my arrival some gunners had fired, killing one bird, and wounding another, a white one, which was swimming by itself, widely separated from the main pack. The dead Goose was a small slate gray bird, of a brownish shade on its head, weighing an estimated four pounds. The bill and feet were black. It was an immature Blue Goose (*Chen caerulescens*). Meanwhile a skiff had been rowed out to the wounded bird, which was captured, and was almost certainly a Lesser Snow Goose (*Chen hyperborea hyperborea*). Mr. Nicklin gave me the following particulars—length twenty-four inches; colour white, except flight feathers which were black, bill pink, inner part black; feet pink.

The great flock, whose numbers one could not estimate from the shore, had all this time been swimming eastward. After picking up the wounded bird, the skiff worked its way down toward the flock, apparently with the object of driving the Geese back to the gunners on shore. They were not very successful in doing this, but did succeed in agitating the great congregation of Geese, and from it large flocks would rise, some to settle again among those on the water, and others, consisting of perhaps three or four hundred birds, to fly westward along the lake and toward the gunners at the mouth of Twenty Mile Creek.

An idea of the great numbers that were present may be gained, from the impression that was received of the resemblance between the sight of these many minor flocks boiling out of the large one and the painted back-ground of the Passenger Pigeon group at the Royal Ontario Museum of Zoology. And with all this disturbance, the appearance of the main flock was little altered. Many white Geese were plainly visible. Mr. Nicklin estimated them as perhaps one to fifty dark (Blue) Geese.

As the flocks flew past us, headed over the mouth of the Twenty Mile Creek, the

white heads of adult Blue Geese were easily visible through my 6x binoculars. They were outnumbered by the dark-headed individuals. A few whites were also in evidence. The gunners fired as the birds flew over our heads, but no hits were made, and the birds veered slightly to the right and continued westward along the south shore of Lake Ontario.

The flock remained in the lake, near Jordan Harbour, for the next couple of days, and then disappeared. They spent most of their time about two miles out from shore, and, as the weather was quite foggy, not many were shot. As far as could be discovered, only about six were captured here, one white-headed and three dark-headed Blues, one fully white plumaged Snow Goose, and two of undetermined species.

At Beamsville and Grimsby, four and eight miles west of Vineland respectively, the same phenomenal flocks were seen at the same time. On October 27, two flocks estimated at 200 each had been seen flying overhead and on the 28th the large flock was present in the lake.

Mr. E. B. Murdock of Grimsby reported seeing "thousands" of Geese off the pier at Grimsby Beach and they kept coming from the east, along the lake continuously. He could see that some were white and some were dark. Mr. Edward Hand, fisherman, of Grimsby, saw the first arrivals well east in the lake on the morning of the 27th and estimated their numbers at 500 in each flock. On Monday the main flock appeared and he considered them to number 10,000. On the 29th there were lots around, on the 30th only two were seen. He saw three dead birds. One a white Goose, and two others Blues with blue and white heads, respectively.

Thus, in this section, covering ten or twelve miles along the lake front, the Niagara "fruit belt," there was great uniformity in the appearance and disappearance of great flocks of these unusual visitors.—W. E. Hurlburt, *Vineland, Ontario.*

Snow Geese at Harrisburg, Pa.—Four Snow Geese, all probably the Lesser (*Chen hyperborea hyperborea*), were seen November 18, 1935, standing on a grassy islet in the Susquehanna River at Harrisburg, Pa. One was a dusky immature. A few Ducks on their autumnal migration rested distantly on the river but the Geese had no relation to them. Richard May was the first to see and identify the Geese.—Harold B. Wood, M.D., *Harrisburg, Pa.*

European Teal at Lexington, Virginia.—On February 1, 1936, I collected an adult male European Teal (*Nettion crecca*) at Big Spring Pond, seven miles west of Lexington, Virginia. It was in company with a female Teal. A pair of Teals, probably these birds, were seen at Big Spring on December 23, when a group of us were taking the Christmas census, but on that and on several subsequent occasions were passed by with only a glance, although I have been watching for this bird for years. When on January 30 I happened to take a real look at them I saw at once that the male was not *carolinense* but *crecca*. The absence of the bar before the wing and the presence of the creamy-white scapular stripe were very noticeable. And at fifty yards in sunlight even the extent of the buff lines in the face and the coarseness of the vermiculation on the sides could be detected. The collecting of the specimen bore out the field identification and Dr. H. C. Oberholser who examined it confirmed the identification. The bird was found to be very fat.

This seems to be the first actual record for Virginia, since, as Dr. Oberholser writes me, a Potomac River record (1885) is strictly speaking "a record from Maryland, although it has commonly been accredited to Virginia." It is apparently the fourth record for the South, there being a recent record from each of the Carolinas.—J. J. Murray, *Lexington, Va.*

Swainson's Hawk in South Carolina.—On November 28, 1935, while visiting Bull's Island, S. C., a part of the Cape Romain Federal Bird Refuge, I was told by Mr. Edward M. Moore, the Superintendent, that he had seen a Hawk on the 27th, which was a stranger to him. He had studied it at some length while it was being mobbed by a band of Crows, and noted its markings carefully. Upon referring to Dr. Chapman's 'Handbook,' and Dr. May's 'Hawks of North America,' he had decided in his own mind that it was a specimen of *Buteo swainsoni*, but added that he was entirely unfamiliar with the bird, and that all he could be absolutely positive of was that it was not the abundant *B. lineatus alleni* or *B. borealis*.

On the next day (29th) while in the house at headquarters, we were summoned outside by the calls of my own, and Mr. Moore's boys. A Hawk was directly over the yard, at a low elevation, attended by a number of Crows which were engaged in bedevilling it to the utmost of their ability. It was in bright sunlight and viewed with 8x glasses, the bird was unmistakably a Swainson's Hawk. So plainly were the markings seen that my youngster remarked the band on the upper breast. My experience with the species during three summers in the West, as well as observations on it in Texas, enabled instant recognition, and I was able to abundantly verify Mr. Moore's identification.

This is the first time that *B. swainsoni* has been observed in South Carolina and it is therefore, an addition to the avifauna of the state. Being on a Federal Refuge, collecting the specimen was not possible, and while sight records are not as satisfactory as specimens in the hand, there was no mistake about the above. In line with species appearing on the eastern seaboard from western areas, the Blue Goose (*Chen caerulescens*) reported from Bull's Island on November 7, 1935, was still there on the 30th.—Alexander Sprunt, Jr., *R.F.D. No. 1, Charleston, S. C.*

American Rough-legged Hawk (Buteo lagopus sancti-johannis) in North Carolina.—While patrolling within the Mattamuskeet Migratory Waterfowl Refuge with Mr. Wille Gray Cahoon I saw a Hawk perched on the top of a small tree near one of the Canal banks and was able to approach closely before it took flight for a short distance. As we both had 8 power glasses and the bird appeared rather tame we were able to determine all of the markings of an American Rough-legged Hawk in the very dark phase. While perching it was attacked by a Marsh Hawk and pursued by two Crows when it flew away along the lake shore, but apparently put up no fight against them and flew deliberately along. As records of this bird in North Carolina are scarce and apparently lacking in the eastern section it seems worth while to record it. This Federal Refuge which lies in Hyde County is only a few miles from the coast.—Earle R. Greene, *U. S. Biological Survey.*

The Prevalence of the Adult Marsh Hawk in South Florida.—During a trip through much of south Florida in the third week of January, 1936, in company with Mr. Robert P. Allen, we were impressed by the numbers of adult Marsh Hawks (*Circus hudsonius*) observed in the Everglades region. The question of where the adult bird of this species winters in any numbers has long been something of a puzzle and it may be that the following will throw some light on at least what appears to be a more than usual concentration in the South.

A total of fifty birds was observed by us. The great majority of these were noted in the region lying west of Lake Okeechobee, between that body of water and Fort Myers; also across the Tamiami Trail and about the little town of Everglades in Collier County. Of the fifty birds seen, ten were adult. This ratio of one to five is excessively high compared to the writer's observations elsewhere in the South,

particularly along coastal South Carolina. He records every Hawk seen on field trips. Since November 1, 1935, to date (February 1, 1936) he has seen 123 Marsh Hawks, three of which were adult! In two weeks in Louisiana in November and December 1934, a total of 176 birds were observed, eight of which were adult.

Wayne (Birds of South Carolina) states that the females and immature birds outnumber the adults fifty to one in coastal South Carolina and I have found this to be consistently the case for years.—ALEXANDER SPRUNT, JR., *Supervisor Southern Sanctuaries National Asso. Audubon Societies, Charleston, S. C.*

The Western Pigeon Hawk in Louisiana, Florida and Illinois.—On the occasion of a visit by Dr. H. C. Oberholser to the Chicago Academy of Sciences, some time ago, two large specimens of the Pigeon Hawk were submitted to him for identification. Both were females. One (C.A.S. 4432) was collected by A. M. Bailey, December 17, 1925, at Chenier au Tigre, La. The other (C.A.S. 4820) was collected by E. S. Hopkins, March 10, 1931, in the same locality. These specimens, which had been recorded by Bailey and Wright (Wilson Bulletin, Vol. 43, p. 204) as *Falco c. columbarius*, were referred by Dr. Oberholser to the form *bendirei*.

On April 15, 1934, another female (C.A.S. 6920) referable to this race was taken at Merritt's Island, Fla., by E. V. Komarek, who was at that time a member of the Academy's staff.

The circumstance that three Pigeon Hawks taken in the South were of this western form led to a further examination by Mr. Bailey of the specimens in the Academy collection. These were compared with a male Western Pigeon Hawk (C.A.S. 4431) taken on Unalaska Island, Alaska, September 25, 1922, by R. W. Hendee, and with the three birds noticed above. Thus was discovered what appears to be the first record of this subspecies for Illinois a female (C.A.S. 1849) taken by F. M. Woodruff at South Chicago, March 18, 1890.—EDWARD R. FORD, *Chicago Academy of Sciences, Chicago, Ill.*

The Sparrow Hawk a Pet Among the Paiutes.—During seven weeks spent last summer (1935) on the Pyramid Lake Indian Reservation, in Nevada, two Paiute families were found keeping Sparrow Hawks (*Falco sparverius*) as pets. A family near the Agency had a young male taken from the nest before it was able to fly. It seemed in the best of condition except for one foot that had been injured accidentally, and was fed on lizards caught by the children of the family. The bird had the freedom of the house, and though unafraid, resented being handled. A finger brought too close to its head was invariably sharply pinched. The other family having a bird, lived in a remote section of the reservation. This bird was not seen at close range as it spent most of the time among the trees and bushes growing thickly about the cabin. According to the Indians themselves, Sparrow Hawks have "always" been kept as pets by the Paiutes.—ARCHIBALD JOHNSON, *Stewart, Nevada.*

Piping Plover (Charadrius melodus) Breeding in the Upper Peninsula of Michigan.—On June 20, 1935, while visiting the shores of Lake Michigan at Manistique, Schoolcraft Co., Mich., we located a flock of nine adult Piping Plovers along the water's edge. While we were watching them through field glasses, one suddenly began to stage the broken-wing ruse and was soon joined in the act by a second. After an extensive search we managed to capture two downy young, both of which were barely able to stand. The adult male and one of the young were collected and placed in the Museum of Zoology, University of Michigan.—OSCAR M. BRYENS, *McMillan, Michigan* and LAWRENCE H. WALKINSHAW, *Battle Creek, Michigan.*

Disposal of Egg-shells by the Upland Plover.—Mr. Henry Mousley has referred in a recent article (The Auk, LII, 4, 408–411) to the different ways in which ground nesting birds treat the shells of hatched eggs. The difference that he notes between species also obtains at times among different pairs within a species. I have seen two nests of the Upland Plover (*Bartramia longicauda*) near Lexington, Va. In the first case, June 3, 1930, all the shells were left in the nest depression after the four young were running about nearby, some pieces being as large as a third of the entire shell. In the second case, May 27, 1935, the shells of the first two eggs to hatch were removed before the last two hatched. I did not see the nest after the other eggs hatched.—J. J. Murray, *Lexington, Virginia.*

Stilt Sandpiper in Arizona.—In the collection of the Museum of Northern Arizona, Flagstaff, are three Sandpipers which have been identified by Dr. J. Grinnell as *Micropalama himantopus*. These birds (Z8.111–Z8.113) were taken by Lewis D. Yaeger on April 25, 1933, from flooded farm land near Tempe, Maricopa County. All were adults: one male, one female, and one sex questioned. Yaeger reports that the species was common, scattered over the area feeding with other Sandpipers. Not previously noted by Yaeger.

Although not reported from New Mexico, Mearns collected this Sandpiper in the state of Chihuahua, Mexico, about one mile from the New Mexico state line (Bailey, F. M.: Birds of New Mexico, 1928, p. 278). This Arizona record then extends the known range of the Stilt Sandpiper in the southwestern United States about 250 miles to the northwest.

The number of individuals seen by Yaeger suggests the possibility of a more westerly migration route than that recorded, rather than accidental occurrence. This possibility is implied by Dr. Grinnell in a letter to me dated January 22, 1936.—Lyndon L. Hargrave, *Museum of Northern Arizona, Flagstaff.*

A Hudsonian and a Marbled Godwit Taken Near Toledo, Ohio.—On September 2, 1935, in Jerusalem township, Lucas Co., Ohio, we collected a female Hudsonian Godwit (*Limosa haemastica*) and a female Marbled Godwit (*Limosa fedoa*). The latter had scars of a recent injury upon the lower breast. Both were feeding together with a small group of shore-birds in a pond near Lake Erie. The skin of the Hudsonian was prepared by Bernard R. Campbell and that of the Marbled by Louis W. Campbell. Both skins have been deposited in the Ohio State Museum, Columbus.

These specimens appear to be the only ones taken in Ohio in more than fifty years. Concerning the Marbled Godwit, Wheaton states:

"Not common spring and fall migrant. Dr. Kirtland notes its capture in several instances in northern Ohio, in addition to that mentioned on page 220, and in connection with the Glossy Ibis following. Mr. Langdon states, on the authority of Mr. Drury, that thirty-three were 'shot in one day, near the mouth of the Little Miami, some years ago by Charles Weeks, Esq.' A specimen was taken by a son of Dr. Jasper in the immediate vicinity of this city [Columbus], April 21, 1879.[1]"

Lynds Jones states: "I am able to add nothing to Dr. Wheaton's records of this bird in the state."[2] William L. Dawson makes a similar statement.[3] Mr. Edward S. Thomas, curator of Natural History at the Ohio State Museum, however, reports that the Museum has a specimen with the following data, "Licking County Reservoir (Now Buckeye Lake L. W. C.), Oct. 8, 1881."

[1] Wheaton, J. M., Section II, Report on the Birds of Ohio, Nov. 1, 1879, p. 480.

[2] Jones, Lynds, The Birds of Ohio, Ohio State Academy of Science Special Papers No. 6 October, 1903, p. 72.

[3] Dawson, William L., The Birds of Ohio, 1903.

Dr. Wheaton's notes on the Hudsonian Godwit are as follows:

"Rare spring and fall migrant. Dr. Kirtland notes its capture in the vicinity of Cincinnati, and Mr. Winslow mentions its occurrence near Cleveland. I met with a flock of eight birds in the spring of 1858, wading in a shallow pond in an old brickyard within the city [Columbus] limits, but was not so fortunate as to secure specimens. In the spring of 1861 a fine specimen was taken below the State dam, near the city, by a sportsman and taxidermist, which was preserved until recently."[1]

In commenting upon this species Jones says: "The records which Dr. Wheaton gives for this species are all that I have been able to find."[2] Dawson also has nothing to add to Dr. Wheaton's account.[3]—Louis W. and Bernard R. Campbell, *Toledo, Ohio.*

Red Phalarope (Phalaropus fulicarius) at Madison, Wisconsin.—On September 22, 1935, in company with my son, I found a female Red Phalarope on a small lake near Madison. When first seen it was swimming in shallow water near the shore and, in its fall plumage, looked much like a "Northern," though appreciably larger and whiter. It covered more distance than the latter; did no spinning, and, though turning quickly from side to side in true Phalarope fashion, it kept on its way. Save for a faint reddish band on the breast, the underparts, as also the flanks and sides of the neck, were of purest white. There are few records of this species for the state, this being the first for Dane County.—John S. Main, *Madison, Wisconsin.*

Glaucous Gull Collected in Ohio.—The Glaucous Gull (*Larus hyperboreus*) was not recorded for Ohio in the lists of Wheaton, Jones, Dawson or Trautman. No specimens or sight records are known for the state previous to 1933.

On March 22, 1933, Thyra Jane Hicks and the writer observed at close range a Glaucous Gull in pure white plumage along the beach at Ashtabula, Ohio. On December 25, 1933, the writer obtained another sight record of an adult along the Lake Erie shore near Conneaut in the same county. On February 25 and 27, 1934, Mr. and Mrs. Fred Stearns and Mr. Lewis W. Campbell secured a third sight record of a bird in second year plumage along the Maumee River within the city limits of Toledo at the western end of Lake Erie (Wilson Bulletin, 34: 119–120, 1934).

On October 19, 1935, while accompanied by Eugene Good, the writer collected a Glaucous Gull on the beach at Ashtabula, Ohio. This was probably a three or four year old bird, being in complete snow white plumage. However, on close examination, about twenty-five small brownish feathers were detected concealed among the body plumage. The specimen is now in the Ohio State Museum collection.

This bird was quite striking when contrasted in size and behavior with the numerous Herring, Ring-billed and Bonaparte's Gulls accompanying it. It weighed in the flesh 1484 grams (53 ounces) as compared to the 923 grams of an immature and the 926 grams of an adult Herring Gull taken at the same time. This specimen is the first of the species taken in Ohio. The early autumn occurrence of this northern bird is somewhat surprising. Even more remarkable was the detection of an adult Iceland Gull among this same flock of Gulls. This bird was observed repeatedly at rather close range, all identification marks being noted, and the bird compared in size with the four other species of Gulls present. All attempts to collect this bird failed.—Lawrence E. Hicks, *Ohio State University, Columbus, Ohio.*

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[1] Wheaton, J. M., op. cit., p. 481.
[2] Jones, Lynds, op. cit., p. 73
[3] Dawson, W. L., op. cit.,

The Status of Forster's Tern in the Western Lake Erie region of Ohio and Michigan.—We are not aware of any published record of the occurrence of Forster's Tern (*Sterna forsteri*) in the western Lake Erie region of Ohio. The few published Ohio records of this species, by Wheaton,[1] Jones,[2] Dawson,[3] and Trautman,[4,5] refer to inland sections of the state. Wheaton,[1] however, suggests that "This Tern may possibly breed in Northern Ohio," which includes the western Lake Erie region, on the basis that "it has been discovered breeding in northern Illinois by Mr. Nelson. . . . "

There appears to be only one published record of the occurrence of Forster's Tern in the western Lake Erie region of Michigan, that of a juvenile bird, collected by Mr. J. Claire Wood[6] on September 10, 1890, along the lower Detroit River, which is considered a part of the western Lake Erie region. The only other definite record for extreme southeastern Michigan that has come to our notice, is by Collins,[7] who states that on June 15 [1880], on Strawberry Island, Lake St. Clair, he found "a nest of the Forster's on a lot of drift rushes." The nest contained three eggs. Collins also collected the nesting bird and later "found several other nests and shot more of the birds."

The three additional records for Lake St. Clair were given by Canadian ornithologists, who though reporting on Canadian birds were obviously considering the status of Forster's Tern on Lake St. Clair as a whole. The oldest of the three records is that of Morden and Saunders,[8] who in 1882 wrote that this Tern is "common" and "breeds at St. Clair." The second record by Langville[9] in 1892, states that there are "a few laying their eggs on the muskrat houses of the St. Clair Flats." The last record, by Macoun and Macoun[10] in 1909, states that this species "is not common at St. Clair flats, Ont., but nests have been taken there by Mr. J. A. Morden. . . . "

It is apparent from these Michigan and Canadian records that Forster's Tern, in former years at least, occasionally nested on the marshes and islands of Lake St. Clair. Apparently no one has reported this species for Lake St. Clair during the past twenty-five years, probably because the birds of this lake have been little studied during this quarter century.

Since the late summer of 1932, Forster's Tern has been repeatedly noted, by the writers and others, in the marshes, beaches and open waters of western Lake Erie, sufficiently often to indicate that the species is probably a regular and not uncommon spring and fall migrant and summer visitor, and may even occasionally nest in such large marshes as the Erie Marsh in southeastern Monroe County, Michigan, and the Little Cedar Point Marsh in Lucas County, Ohio. A rather careful survey in these marshes during the nesting season of 1934 and 1935, however, has yielded no actual nesting evidence, though two birds were observed on May 27, 1934, feeding each other and displaying other courtship behavior. We list below the sight records and specimens of this Tern for the western Lake Erie region since 1932. The majority of the records are of immature birds, which can readily be distinguished from the

[1] Wheaton, J. M., Birds of Ohio. 1882, p. 560.
[2] Jones, Lynds, Birds of Ohio. Ohio State Acad. Sci., 1903, pp. 31–32.
[3] Dawson, William Leon, Birds of Ohio. 1903, p. 558.
[4] Trautman, Milton B., Auk, 1928, p. 200.
[5] Trautman, Milton B., Auk, 1933, p. 235.
[6] Swales, B. H. and P. A. Taverner, Auk, 1907, p. 137.
[7] Collins, W. H., Oologist, 1880, p. 65.
[8] Morden, J. A. and W. E. Saunders, Canadian Sportsmen and Naturalist, 1882, p. 194.
[9] Langville, J. Hibbert, Our Birds in their Haunts. 1892, p. 532.
[10] Macoun, John and James M Macoun, Catalogue of Canadian Birds. 1909, p. 52

vastly more abundant Common Terns (*Sterna h. hirundo*). We probably missed many of the adult Forster's Terns, for these, when silent, can be definitely identified in a flock of adult Common Terns, with which they usually associate, only under the most favorable circumstances.

The sight records are: 4 birds, Sept. 13, 1932; Mich., Monroe Co., Erie Marsh, E. L. Wickliff, Milton B. Trautman. 1 bird, June 24, 1933; Ohio, Lucas Co., Little Cedar Point, L. W. and B. R. Campbell. 1 bird, July 1, 1933; Ohio, Lucas Co., Little Cedar Point, L. W. and B. R. Campbell. 1 bird, July 4, 1933; Ohio, Lucas Co., Little Cedar Point, L. W. and B. R. Campbell. 4 birds, May 27, 1934; Mich., Monroe Co., Erie Marsh, J. Clark Salyer, L. W. and B. R. Campbell, M. B. Trautman. 2 birds, May 30, 1934; Mich., Monroe Co., Erie Marsh, Max M. Peet. 1 bird, June 15, 1934; Ohio, Lucas Co., Little Cedar Point, B. R. Campbell. 1 bird, July 7, 1934; Ohio, Lucas Co., Little Cedar Point, L. W. and B. R. Campbell. 2 birds, July 15, 1934; Mich., Monroe Co., Erie Marsh, L. W. and B. R. Campbell. 2 birds, July 23, 1934; Mich., Monroe Co., Erie Marsh, L. W. and B. R. Campbell. 2 birds, Aug. 12, 1934; Mich., Monroe Co., Erie Marsh, L. W. and B. R. Campbell. 2 birds, Sept. 8, 1934; Ohio, Lucas Co., Waterville Twp., Maumee River, L. W. and B. R. Campbell. 2 birds, Sept. 9, 1934; Mich., Monroe Co., Erie Marsh, L. W. and B. R. Campbell. 2 birds, Oct. 7, 1934; Ohio, Lucas Co., Washington Twp., Maumee Bay, L. W. Campbell. 1 bird, Oct. 21, 1934; Ohio, Lucas Co., Washington Twp., Maumee Bay, L. W. Campbell. 1 bird, June 15, 1935; Ohio, Lucas Co., Little Cedar Point, L. W. and B. R. Campbell. 1 bird, July 7, 1935; Mich., Monroe Co., Erie Marsh, L. W. Campbell. 1 bird, July 28, 1935; Mich., Monroe Co., Erie Marsh, L. W. Campbell, M. B. Trautman. 1 bird, Aug. 10, 1935; Mich., Monroe Co., Erie Marsh, L. W. and B. R. Campbell. 4 birds, Aug. 29, 1935; Mich., Wayne Co., Gibraltar Bay, M. B. Trautman. 1 bird, Aug. 31, 1935; Mich., Monroe Co., Erie Marsh, L. W. Campbell. 2 birds, Sept. 14, 1935; Mich., Monroe Co., Erie Marsh, L. W. Campbell. 9 birds, Oct. 27, 1935; Ohio, Lucas Co., Washington Twp., Maumee Bay, L. W. Campbell. 6 birds, Nov. 2, 1935; Ohio, Lucas Co.,Washington Twp., Maumee Bay, L. W. Campbell. 8 birds, Nov. 10, 1935; Ohio, Lucas Co., Washington Twp., Maumee Bay, L. W. Campbell.

The specimens collected are: Univ. Mich., 73811, ♂ May 27, 1934; Mich., Monroe Co., Erie Marsh, M. B. Trautman. Univ. Mich., 73812, ♀ May 27, 1934; Mich., Monroe Co., Erie Marsh, M. B. Trautman. Univ. Mich., 84834, ♂ July 28, 1935; Mich., Monroe Co., Erie Marsh, M. B. Trautman. Ohio State Mus., ♀ Sept. 8, 1934; Ohio, Lucas Co., Waterville Twp., Maumee River, B. R. Campbell. Ohio State Mus., ♀ June 15, 1935; Ohio, Lucas Co., Little Cedar Point, B. R. Campbell. Ohio State Mus., ♀ Oct. 27, 1935; Ohio, Lucas Co., Washington Twp., Maumee Bay, L. W. Campbell. Max M. Peet Coll., 3600, ♂ May 30, 1934; Mich., Monroe Co., Erie Marsh, Max M. Peet. Max M. Peet Coll., 3601, ♀ May 30, 1934; Mich., Monroe Co., Erie Marsh, Max M. Peet:

Louis W. Campbell, *Toledo, Ohio*, and Milton B. Trautman, *University of Michigan Museum of Zoology, Ann Arbor, Michigan.*

Kittlitz's Murrelet Breeding at Wales, Alaska.—On July 19, 1934, a female Kittlitz's Murrelet (*Brachyramphus brevirostris*), with bare abdomen, was taken by a representative of The Chicago Academy of Sciences at Wales, Alaska. The label attached to the skin sent to us gives the specific locality as "top of Hill Point" and sets forth that the bird was found with one egg, heavily incubated. The egg according to the label, was broken. The collector failed to send the fragments.

We wrote for details and in February, 1935, received word from the collector: "that Kittlitz's Murrelet was found above the old mission manse near the top of the mountain not far from the trail which most of the women used to travel to pick leaves the other side of the point. As I remember the location of the nest was about 250 to 300 yards from the water. The bird was wild. When it flew from the nest it just seemed to slide down to the sea. The old folks say that nests used to be found, too, on top of the mountain near Lopp Lagoon."

In March we wrote to the native asking him to try to get us another bird with the egg.

Hence, August 10, 1935, we received our first egg of Kittlitz's Murrelet. The letter which accompanied it says: "I found the one you wanted much but the set was not complete. When I found the nest of Kittlitz Murrelet there was only one egg. I waited two days for the other to be laid and finally just before I went up to the Inlet, I tried to get hold of the bird for the set but it was wild. I saw it only three times, first without my gun. Twice again I tried to get it but it was too wild. I took the egg and blew it. I found it was incubated already."

The label sent with the egg reads "Top of mountain, Wales, Alaska, June 29, 1935."

The specimen measures 62.1 x 36.8 mm. It is cylindrical ovate in shape. Its texture is "waxy" smooth except that it is slightly granulated at the ends. It has the ground color of the Xantus's Murrelet egg figured as No. 6 on Pl. 49 of Bent's 'Diving Birds of North America.' The markings are similar too, in character, but in color are black or very dark brown. In shape it is exactly like the Marbled Murrelet's egg shown as No. 5 on Pl. 48 of the same work.

In thirteen years of collecting in Alaska, we have obtained four specimens of *brevirostris*—four from Barrow and the female, noted above, from Wales. No Murrelets of any other species have been obtained. A. M. Bailey (Condor, Vol. 27, p. 65) writes "The bird seems to be a species of the ice floes" and records that Hendee took specimens off shore from Wainwright. He adds "On April 28 I took one in the winter plumage at Cape Prince of Wales. It was feeding along the broken shore ice, and the next day I saw two others of which I secured one in the typical spring plumage. The Wales natives called it "ey-ah-azruk" and said the birds nested on Wales Mountain, but I did not see a bird after the above date on the American side of Bering Strait. On June 3 when we were drifting with the pack ice along the Siberian shore near East Cape, two of these Murrelets were flushed. They uttered alarm notes similar to those of baby chicks."

It is of considerable interest now to have confirmation of the natives' statement that the birds "nested on Wales Mountain."—Edward R. Ford, *Chicago Academy of Sciences, Chicago, Ill.*

A New Ciccaba from Southeastern Mexico and Northern Guatemala.—Upon examination and checking of localities, it appears that certain light-colored specimens of *Ciccaba virgata* are found only in particular areas and are different from previously described forms of the species. They are therefore characterized as a new race.

Ciccaba virgata eatoni, subsp. nov.

Subspecific characters.—Nearest *Ciccaba v. centralis*, but lighter on upper parts in both phases; back and wing coverts more numerously and more finely barred and vermiculated with dull buffy white to grayish; superciliary area always with a broad, prominent, pure white stripe in the male; chest and breast with white ground color predominant, never numerously barred or splotched with brown; ground color of

sides, abdomen, and tibial feathers mostly pure white, never heavily washed with buffy, never strongly mottled with dusky at the tips of the feathers in dark phase; under tail coverts pure white, never heavily barred or streaked with dark brown; differs from *Ciccaba v. squamulata* in having the upper parts darker and duller grayish brown with less of a fulvous or buffy cast; and the crown, hind neck, and back barred and vermiculated instead of spotted; differs from *Ciccaba v. tamaulipensis* in having the light markings of the upper parts finer and whiter.

Type.—Adult male, U. S. Nat. Mus. No. 167,729, Apazote, Campeche, Mexico, December 26, 1900, collected by Nelson and Goldman, original No. 7411.

Measurements of type.—Wing, 225; tail, 130; culmen, from cere, 18.5 mm.

Range.—Tropical Zone, Apazote and Champoton, Campeche, Mexico, to northern Peten, Guatemala.

Remarks.—Twelve specimens of this new form and twenty-five specimens of *Ciccaba v. centralis* have been examined. Females, which usually have a darker ground color on the upper parts than the male, may have the light superciliary area tinged with dark brownish.

This form is named for the late Warren F. Eaton, who rendered noteworthy service in the protection of Hawks and Owls.—Leon Kelso and Estelle H. Kelso, *Washington, D. C.*

Chimney Swifts Nesting in a Barn.—In a barn near my home, Cattaraugus Co., N. Y., a pair of Chimney Swifts (*Chaetura pelagica*) have nested for fifteen years, perhaps longer. The nest is fastened to the end wall, near a six inch square opening made for a hay rope, but used for entrance by the Swifts. Only two birds return each year. New mates may have replaced one or both of the original birds, but the young, apparently, have found other haunts. The Swifts have usually nested with success. One season, however, a "rest" was taken, and though the birds started a nest, and continued to roost on the adjacent wall for some time, no eggs were laid.

The rigors of winter often injured or destroyed the old nest, and the birds usually rebuilt each year, but the 1934 nest, which remained intact, was reused in 1935. The Swifts strengthened it by adding a dozen twigs below, as a prop-like support, and cementing again the points where the nest rim met the wall.

Other duties precluded a careful study of the nesting in 1935, but a few observations of possible interest were made. Four eggs were laid from June 9 to 15 on alternate days. On the 13th, and thereafter a bird occupied the nest at every inspection, and incubation, I believe, was started that day. The pair were frequently at the nest together. Twice I observed one clinging to the nest edge while its mate incubated. At night a light revealed one on the nest and the other roosting nearby but not, to my knowledge, incubating side by side as noted by Miss Stella M. Davis, (Forbush, Birds Mass., v. 2, p. 312).

During the day the incubating bird permitted a close approach, at times within a foot or two. It then left the barn, or, quite frequently, moved to the wall near the nest. When the latter occurred, the Swift often flew nervously from place to place on the wall in a peculiar manner. Slowly elevating the wings to their fullest extent above the back, the bird then snapped them down and fluttered to a new position three or four feet away.

After a two day absence, I found three young in the nest on July 2; by the following day the fourth egg also had hatched. When bringing food, the parent entered the opening and alighted a foot or two below the young. After some hesitation the bird, with wings beating and tail spines scraping the boards, "taxied" to the nest. There also the parent maintained its position on the edge of the nest platform by use of the

wings, especially when the young were well grown and crowded forward. The only count of feedings made was on July 24, when three occurred from 10:45 to noon. Although I believe Chimney Swifts feed their young less frequently than do many small birds, there is no approach to the five hour or greater intervals between feedings characteristic of the Black Swift (*Nephoecetes niger borealis*) as observed by Charles M. Michael (Condor, 1927, v. 29, pp. 89–97). Feeding continued late in the evening, ceasing only with complete darkness. Some observers (e. g., Frank Bolles in Popular Science Monthly, 1894, v. 45, pp. 24–29) have described truly nocturnal activity, but my Swifts were always quietly roosting when I inspected them at night. The young, when about half grown, were obviously much crowded in the small nest and began to clamber about the surrounding wall. Audubon states (Birds of America) that if the nest falls, the Swiftlets climb the wall and live. While this is without doubt true when they are well grown, I noted one year that after the nest rim was accidentally broken, the young, but a day or two old, tumbled out, and although I repeatedly replaced them, only one survived. At three weeks of age the young in 1935, as they clung to the wall with long wings extended far below their tails, appeared like adults. They now exercised by the method described above for the incubating bird when alarmed, deliberately raising the wings, snapping them down, and fluttering to another spot. Despite much practice of this kind, the Swifts sometimes delay nest-leaving for several days after attaining full growth. On July 25, 1935, as I approached the nest, two of the birds flew from the barn for the first time, one I collected, and the fourth, after flying the length of the building without finding exit, settled again near the nest. That they at times find their way out of the barn with difficulty was demonstrated on a former occasion when I saw one, covered with dust and cobwebs, fluttering among the rafters. A visit on the night of July 27, 1935, revealed the five Swifts, parents and young, clustered near the nest to roost. Again on the 28th they roosted together, but two nights later they had left; thus corroborating the statement of Otto Widmann (Trans. Ac. Sc. St. Louis, 1922, v. 24, p. 58), and others, that when the young are able to fly well, the entire family joins others of their kind at some favored roost.

Young Swifts, as is well known, utter loud, rasping calls when fed. Any disturbance or jar sets them off, and the cries, given with upward thrusts of the open beak, are continued for several seconds. Then all cease calling in a moment, as by clockwork. The nestlings, when a week or two old, also give subdued twitters, which become louder with age and probably change into the rather similar notes of the adults. The old birds, while about the nest, give frequent utterance to vigorous and extended twittering.—Dean Amadon, *Cornell University.*

Second Appearance of the Rufous Hummingbird at Pensacola, Florida.—From November 26 through December 13, 1934, the Rufous Hummingbird was seen almost daily at my home in Pensacola, Florida, and a specimen was obtained (Auk, vol. LII, p. 187).

On December 8, 1935, Mr. Francis M. Weston observed a Hummingbird in his yard, which is about a half mile from my home, while on December 12 a bird was reported by my mother; both were suspected of being the Rufous Hummingbird. I saw the bird on December 14 and again on December 17, at which time I was afforded such an excellent view that the bird could be identified unquestionably as an adult male Rufous Hummingbird (*Selasphorus rufus*). It was last seen on December 19.

The favorite food plant both years was the Chinese hibiscus (*Hibiscus rosa-sinen-*

sis), but it was also feeding on a red *Salvia*. Its departure both in 1934 and 1935 coincided with the destruction of its source of food by cold weather.

The first occurrence was accepted as a chance wanderer, but its second appearance suggests that its occurrence in the Eastern United States might be more regular than is supposed, and it is suggested that all winter Hummingbirds be examined closely.—Robert C. McClanahan, *1700 E. Avery Street, Pensacola, Florida.*

Pileated Woodpecker in Grand Canyon National Park.—During the past year several interesting bird observations have been reported from Grand Canyon National Park, the most recent of which was recorded by the writer in August of this year.

On August 5, 1935, Park Ranger N. Dodge and I were on the North Rim of the Grand Canyon in the vicinity of Saddle Mountain. The vegetation in that locality is typical of the Canadian Zone, mostly spruce and fir. As we were passing a large fir tree, we both observed numerous large holes, obviously recent Woodpecker workings. Examining them closely, we came to the conclusion that, without doubt, the holes were the work of the Pileated Woodpecker. Several of the holes were measured to learn the diameters and depths as a further aid in determining the identity of the bird. The largest hole measured five inches in diameter and seven inches in depth. Several others measured slightly less. Although we looked the region over thoroughly, no trace was found of the bird, but several other trees were found with similar holes dug into their trunks.

On August 30, while going through a heavy growth of fir on the Saddle Mountain-Point Imperial area, I heard a loud tapping sound from a nearby tree, and investigated to see what was causing it. To my astonishment a large bird took off from the trunk of the tree, flew about twenty-five yards, and landed on another tree in plain sight—without doubt a Pileated Woodpecker (*Ceophloeus pileatus* subsp?). For several minutes I studied the bird with binoculars from about fifty feet to make absolutely sure of its identity, and to learn something regarding its habits. Having studied the species in the Sierra Nevada of California, the identity of this bird was easily recognized.

Immediately after this incident I wrote to Dr. Charles T. Vorhies, University of Arizona, and to Mr. Lyndon L. Hargraves, Curator of Ornithology at the Museum of Northern Arizona, requesting any data that they might have regarding the occurrence of this bird in Arizona. Both replied that they knew of no records for the state, and that this one was therefore of much interest and importance.

It will be very interesting to see if this bird or others of its kind are found on the North Rim of the Grand Canyon next summer.—Russell K. Grater, *Assistant Wildlife Technician, Grand Canyon National Park, Arizona.*

Occurrence of Rough-winged Swallow at Wells River, Vermont.—On July 25, 1934, we noted a Rough-winged Swallow (*Stelgidopteryx ruficollis serripennis*). The bird was resting on a guy wire, fifteen feet above ground, and was observed carefully at short range with six power binoculars for several minutes. Absence of brown breast band and dark throat and breast were noted and also larger size, making confusion with the Bank Swallow (*Riparia r. riparia*) impossible. Subsequently an individual of this species was seen on August 4, 1934.—Wendell P. Smith, *Wells River, Vermont.*

Porcupine Quills Kill Raven.—Mr. W. D. Barnard, Northern State Forest Nursery, Trout Lake, Vilas County, Wisconsin, found a dead Raven November 8, 1935, which he gave to me a week later. Autopsy showed the bird, a female, to be in

good condition. Further examination by Dr. C. A. Herrick of the veterinary science department revealed the tip of a porcupine quill, five-eighths inches long, projecting from the wall of the gizzard. A second quill tip of this size had penetrated the heart wall and lodged in the right auriculo-ventricular valve. A connective tissue sheath had been laid down around the obstruction, but otherwise no signs of any pathological condition.—LEONARD WILLIAM WING, *University of Wisconsin, Madison, Wisconsin.*

Unusual Nest Site of the Loggerhead Shrike (Lanius ludovicianus ludovicianus).—At Ft. Lauderdale Fla., March 5, 1935, a Loggerhead Shrike began building a nest on one of the lower branches of a long-leafed yellow pine. The site was a little more than fifty feet from the ground. As theretofore, except on one occasion, I had never seen the nest of any Shrike more than eight or ten feet up, I made it a point to observe this one particularly.

When the young were hatched a large part of their diet consisted of the small chameleons common in the hedges and shrubbery of the locality. Lacking thorns or sharp twigs anywhere near the nest the birds impaled the quarry, not needed for immediate consumption, on the splintered stubs of branches of the pine which had been twisted off in south Florida's historic hurricane.

The young were not seen out of the nest until April 25. For a day or two after they first appeared they could be observed adventuring out along the home branch and then scrambling back again. About that time the first Gray Kingbirds appeared in nearby pines. These made no stand when the Shrikes assailed them and drove them away.

I could not determine exactly when incubation began. The nest was well started when I first noticed it. Fifty-one days elapsed before the young came off.—EDWARD R. FORD, *Chicago Academy of Sciences, Chicago.*

A Second Record of the White-eyed Vireo in Guatemala.—Included in a collection of birds made by the Leon Mandel expedition to Guatemala for Field Museum in 1933–34 is a single White-eyed Vireo (*Vireo g. griseus*). This specimen (F.M. 93996) is a female taken by the writer on December 18, 1933, at Bobos, a plantation of the United Fruit Company near Bananera, Izabal.

We are able to find but one other definite record of the occurrence of this form in Guatemala. In November, 1859, a specimen was collected for Salvin and Godman at Coban, Alta Vera Paz. (Biol. Cent. Amer., I, 1881, p. 200.)

The three specimens taken in March, 1928, at Tela, Honduras, by J. L. Peters (Bull. Mus. Comp. Zool., 69, p. 460, 1929) appear to constitute the only additional record for Central America. Two of these birds, collected March 7, were thought to be mated and the third, a male obtained a week later, was heard to sing. In no case, however, was there evidence of sexual activity.

It is quite probable that the White-eyed Vireo will eventually prove to be a more abundant winter visitant in the Caribbean slope of Central America than has yet been established.—EMMET R. BLAKE, *Field Museum of Natural History, Chicago, Illinois.*

The Sonora Yellow Warbler in Western Kansas.—A remarkable new record came to light recently when a female Yellow Warbler in the Kansas University collection (KU5851) was identified by Dr. H. C. Oberholser as *Dendroica aestiva sonorana.* Dr. Oberholser penciled on the back of the label "typical *sonorana*, evidently a straggler." This specimen was taken by Bunker and Rocklund on the Smoky Hill River, two miles south of Wallace, Wallace County, Kansas, on June 24,

1911. This is an area of treeless plains, except for a narrow strip along the stream, which is grown up with willow trees, some of them very old and twisted by the wind.

The above specimen of Yellow Warbler is the only one known from extreme western Kansas, but the species has been recorded by Linsdale (Auk, vol. 44, no. 1) at Coolidge, and by Menke (Kan. Univ. Sci. Bull. vol. 32, no. 3, 1894) at Garden City. More specimens of the Yellow Warbler from this section of the state are needed badly to determine the true status of the species.—W. S. Long, *Zion National Park, Utah.*

Connecticut Warbler (Oporornis agilis) in Northern Michigan.—On June 10, 1934, a male Connecticut Warbler was noted at Munuskong Bay, Chippewa Co., Michigan. This was in a well wooded area, grass and bush grown, spring-fed and damp. This bird was collected. Another was observed in the same woodland on June 14, 1934.

On June 9, 1935, two males were located along the Tahquamenon River valley about a half mile from that river just north of the town of McMillan, Luce Co., Mich., in a black spruce swamp. The ground was covered with a thick mass of sphagnum moss through which protruded masses of Labrador tea and other shrubs. Oscar M. Bryens and I returned to the area later and searched for the nest without success. The male on one side of the road was nearly always singing in the same tree about twenty feet from the ground. He paid little attention to the presence of man. Although I searched the region on June 10, 11, 12 and 18 and found both males present in the same location I had no success in locating a nest.

The song given by the birds was the regular "Freecher-freecher-freecher-freecher." At 5 A.M. on June 12 both males were timed with a stop watch and uttered this song for a period of several minutes at the rate of six times per minute—Lawrence H. Walkinshaw, *Battle Creek, Michigan.*

Plumage Variations in the Mourning Warbler (Oporornis philadelphia).—These birds were observed in Essex County, N. Y., on their breeding grounds, all but one having been seen in an area a quarter mile in diameter.

Males: some had small patches of black on the sides of the breast patch; some had practically clear slaty throats, one had black specks extending right up to the chin. One had broken patches of black along the lower border of the breast patch. In one the yellow belly extended in a little triangle into the black breast patch.

Females: one had a wash of light sulphur on the throat; the breast and spots on the throat were light slaty. This bird had thin crescents of white around the eye. One had no yellow on throat or breast, but had a practically white throat. In this bird the white around the eye formed an almost complete ring. The other females seen had a very thin complete eye ring of white. One was yellowish below but for a band of light slaty across the breast. One was completely yellow below except for a very faint slaty band across the breast.—Geoffrey Carleton, *52 W. 94 St., New York City.*

Maryland Yellow-throat in Winter in Maryland.—While making a bird census at Lake Roland, Baltimore Co., Md., on December 22, 1935, I came upon a female Maryland Yellow-throat (*Geothlypis trichas*) and followed her for half an hour as she hopped through the sedges. Snow was falling at the time. As I returned past the spot at dusk the bird was still there.—W. Brooke Meanley, Jr., *5111 Roland Ave., Baltimore, Md.*

Summer Tanager (Piranga rubra) Eating Wasps.—On the morning of

June 20, 1935, I saw a male Summer Tanager attack a colony of wasps, killing some and apparently driving off the rest and then, tearing the nest to pieces from the top, he set to work on the comb apparently devouring the larvae and carrying some of them away.

The nest of this common black and white paper nest wasp was in a pine tree near the kitchen window from which I watched the performance for about half an hour. When I first noted some unusual activity the bird was pecking at something which he held. Then perching on a twig about three feet from the wasp nest, he sat for a moment facing the nest. I noted then that about a dozen wasps were flying about the nest in an excited manner. The bird then made a dive toward the swarm, seized a wasp and flew off to a resting place nearby. I was at first in doubt whether he was eating the wasps or merely killing them. I afterward found several dead wasps beneath the tree on the ground. After several times repeating the attack the wasps all suddenly disappeared whereupon the Tanager alighted on the nest and rapidly tore the upper protecting layers away and attacked the comb.

The nest was not more than six inches high and had two combs.

Within the next several hours about a third of the comb was destroyed. The finish of the performance I did not witness as we left home that morning and on our return six weeks later there was practically nothing of the nest left.

The wasp nest was less than ten feet from the window of the kitchen from which I was looking. The Tanagers have been at home at the rear end of the lot for several years.—J. I. Hamaher, *Randolph-Macon Woman's College, Lynchburg, Va.*

Cardinal at Milton, Mass., in Winter.—A female Cardinal (*Richmondena cardinalis cardinalis*) was seen at my home in Milton, Mass., on December 8, 1935, and again on the 16th when I had an excellent opportunity to study her in detail with 8x glasses. Since then she has visited the feeding box daily up to the present (January 10, 1936) usually in company with Juncos and Chickadees. She seems especially interested in sunflower seeds which she has some difficulty in cracking by a sideways motion of the mandibles which gives the appearance of chewing. I have seen only one other Cardinal here, a male, on June 29, 1897.—Henry S. Forbes, *Milton, Mass.*

The Name of the Antiguan Bullfinch.—In his account of the birds of Anguilla (Auk, Vol. XLIV, Oct. 1927), Mr. Peters states that the subspecific name *chazaliei* Oustalet should apply to the Bullfinch of Antigua, if Barbudan and Antiguan specimens should prove identical. This is, in fact, the case, but *ridgwayi* Cory has three years priority over Oustalet's name, so that the Bullfinch of Anguilla, St. Martin's, Barbuda and Antigua should be known as *Loxigilla noctis ridgwayi* (Cory).—James Bond, *Acad. Nat. Sciences, Philadelphia.*

Sporophila lineola Taken in New Hampshire.—From time to time many unusual species of birds have been taken at the University of New Hampshire Marine Laboratory, located at the Isles of Shoals, ten miles off Portsmouth, New Hampshire. The most unexpected visitor of this sort was an adult male specimen of *Sporophila lineola* taken at the Isles of Shoals, August 8, 1935. Aside from the fact that the tail feathers were being molted, the plumage was in good condition. Identification was made by comparison with specimens in the Museum of Comparative Zoölogy. The species is normally found in South America, and so far as we have been able to ascertain, it has never been taken before in the United States.—C. F. Jackson, *Professor of Zoology, Univ. New Hampshire, Durham, N. H.*

Some Observations on the Eastern Goldfinch (Spinus tristis tristis).—August 4, 1934, I found a nest of the Eastern Goldfinch (*Spinus tristis tristis*) eight feet up, near the end of a lower branch of a small locust tree. While this nest was a new one, its condition led me to believe it was deserted. Looking about the vicinity I found, supposedly, a second attempt by the same birds, some eighty feet distant, and in a very similar situation, in a locust. It held two eggs on that date. Leaving it undisturbed until the 7th, I collected the nest and four eggs, as a farm hand was preparing to cut down the tree for converting into posts.

Being in the vicinity again on the 19th, I looked at the tree where I had seen the abandoned nest and found that every vestige had been removed.

Believing the removal had been by the same pair in a third attempt at nesting, I looked around and saw a female Goldfinch sitting on a nest in a very similar situation, eight feet up, near the end of the lowermost limb of an apple tree, fifty feet away.

I believe that this one pair built all these nests, this last one from the material taken from the first, which they had deserted.

Facts gleaned from previous experiments, showed that only twelve to fifteen days elapse from the loss of one effort until the birds had another nest built and a full complement of eggs laid.—J. Warren Jacobs, *Waynesburg, Pa.*

Correction.—In the Auk for January 1936, on page 119 under the review of "Bird Banding," you refer to my article on "Survival as Indicated By Returns to Summerville, South Carolina" as dealing with "White-throated and Chipping Sparrows and Red-eyed *Vireos*." The last word is wrong, and should read Towhees. I make this correction in the interest of accuracy.—Wm. P. Wharton, *Summervill, S. C.*

Nesting of the Nevada Savannah Sparrow in Bottineau County, North Dakota.—In 1934, while on a collecting trip to Bottineau County, North Dakota, which lies in the extreme northeast corner of the state, the writer was very fortunate in finding what is purported to be the only set of eggs of the Nevada Savannah Sparrow ever taken in North Dakota. The nest, collected with five slightly incubated eggs on May 27, was situated in a furrow in a large, shallow, dry slough in rolling prairie country and was placed flush with the ground and extremely well hidden in a tuft of dead grass. It was compactly constructed of dried grass and fine weed stems lined with finer grasses and a few strands of black horsehair. The female flushed from beneath my feet and flew some distance away where she was soon joined by the male. Both birds were shot in order to insure correct identification.—Frederick B. Philipp, *Short Hills, New Jersey.*

An Unusual Nesting Site of the Slate-colored Junco.—On June 11, 1933, at the residence of Dr. Will S. Monroe, I discovered an unusual location for the nest of the Slate-colored Junco (*Junco h. hyemalis*). The structure, composed of dried grasses, fern stocks, and other bits of vegetation was placed at an elevation of eight feet above the ground in a trellis overgrown with woodbine (*Psedera vitacea*). Formed in the usual deep cup shape, it was supported from all sides by the tangle of vines. The nest contained three or four young, only a few days old.

It would be impossible to hazard even a conjecture regarding the choice of so extraordinary a location but the presence of four dogs about the place may have been a factor in preventing building on the ground.

Of particular interest seemed the slight display of something which might be called initiative in the choice of this location and also the close conformity to habit

shown in utilizing the arrangement of the vines and in construction of the nest to produce a result comparable to the structure placed in the usual location.—WENDELL P. SMITH, *Wells River, Vermont.*

The Golden-crowned Sparrow in Illinois.—What appears to be the first Illinois record for the Golden-crowned Sparrow (*Zonotrichia coronata*) is that of a bird taken, November 28, 1935, at Waukegan, Lake Co. It was an immature female and was found by W. I. Lyon, together with several White-throated Sparrows, in one of the traps used at his bird banding station.

The only other record for the Chicago region refers to a male taken in Racine Co., Wis. in April 1858, by Dr. Hoy. The species has been reported also from Massachusetts.—EDWARD R. FORD, *Chicago Academy of Sciences, Chicago, Ill.*

The Distribution of the Atlantic Song Sparrow.—The Atlantic Song Sparrow (*Melospiza melodia atlantica* Todd), described from Smith's Island, on the ocean side of the northern peninsula of Virginia, has been supposed to range only along the beaches and marshes bordering on the Atlantic Ocean. On March 20, 1932, during a considerable migration of Song Sparrows in the marshes at Cornfield Harbor, Maryland, near the point where the Potomac River enters Chesapeake Bay, I collected two males of this race, and later found it to be the breeding form in the marshes near the beach there. A breeding male taken May 26, 1935, definitely establishes that fact. This led to consideration of the breeding Song Sparrows elsewhere along the lower Potomac with the result that I find the Atlantic race nesting as far up river as one and one half miles above Morgantown, Maryland, where a breeding male was taken July 14, 1935. This point is distant in an airline only a little more than forty miles from the city of Washington.

It is evident that *atlantica* has a somewhat extended range along the lower part of Chesapeake Bay and its larger tributaries and it appears possible that it may range along the beaches as far as there is definite influence of salt water. At Morgantown and Cornfield Harbor it is partial to growths of *Baccharis.*

It is interesting to observe that while in mannerisms and notes the Atlantic Song Sparrow does not differ appreciably from the inland *Melospiza melodia melodia* to an accustomed eye it appears distinctly larger, and duller, less rufescent in color. In fact the two seem more distinct when seen in life than when examined in the form of museum specimens.—ALEXANDER WETMORE, *U. S. National Museum, Washington, D. C.*

Eastern Snow Bunting at Harrisburg, Pa.—On February 13, 1936, I found an Eastern Snow Bunting (*Plectrophenax nivalis nivalis*) feeding with twenty-one Prairie Horned Larks (*Otocoris alpestris praticola*) in open fields within the city limits of Harrisburg, Pa. With them were numerous Eastern Tree Sparrows, all feeding on the seeds of tall grasses and goldenrod projecting above a foot of snow. At a distance of about fifty feet the Snow Bunting was distinctly identified with 8x binoculars. It (probably she) was less timid than the Prairie Horned Larks. On February 7 I had seen a flock of nineteen Prairie Horned Larks in a field directly back of my residence in Harrisburg. They paid no attention whatever to automobiles on the main street only thirty feet away. This is the first record, as far as I could ascertain, of a Snow Bunting being seen in the Harrisburg area, and the first appearance of such large flocks of Prairie Horned Larks within the city limits.—HAROLD B. WOOD, M.D., *Harrisburg, Pa.*

Snow Buntings in Harrison County, West Virginia.—During the very heavy

snows, with sub-zero weather, that came during the week of Christmas, 1935, there were notable concentrations of birds at points in central West Virginia where cattle were being fed. We found, in looking for birds at this time, that our best method was systematically to visit such spots.

On January 1, 1936, Mr. A. S. Margolin, Miss Dorothy Brooks, Mrs. Brooks, and the writer were driving near Romine's Mill, Harrison County. Our attention was called to a flock of small white-appearing birds in flight, and when we stopped we found a flock of six Snow Buntings (*Plectrophenax nivalis nivalis*) feeding with a large flock of Prairie Horned Larks. The birds were examined with good glasses, their general white appearance in flight making them unmistakable. We particularly noted the pure white underparts as they flew whistling above us.

The only previous record for this species in West Virginia was made by Mr. Earle A. Brooks at French Creek, Upshur County, on December 21, 1886. We still do not have, so far as I know, a specimen taken in the state, but it seems well to publish this sight record, since it was made under favorable circumstances.—MAURICE BROOKS, *West Virginia University, Morgantown, W. Va.*

New Birds for Churchill, Manitoba.—The observations recorded below were made at Churchill, Manitoba during the summer of 1934.

Hydroprogne caspia imperator (Coues). CASPIAN TERN.—In 1931 Twomey (Taverner and Sutton, the Birds of Churchill, Annals of the Carnegie Museum, Vol. 34, p. 58) took a male of this species but no other observations have been recorded. On the evening of July 2 three of these birds flew over the town of Churchill and on August 4 and again on August 9 one of these large Terns was seen over Hudson Bay near the town site. No specimens were secured but the notes, size and coloration of this species are quite distinctive.

Sitta canadensis Linnaeus. RED-BREASTED NUTHATCH.—One was observed on August 4 in a heavy stand of spruce near the gravel pit about six miles from Churchill. It was not collected but permitted a close approach so that there could be no mistake as to its identification. Taverner and Sutton (p. 66) mention a very early observation of this species fifty-five miles south of Churchill and suggest the possibility of its occurrence.

Spizella passerina arizonae Coues. WESTERN CHIPPING SPARROW.—This record is based on a specimen collected by the author on July 11 in a spruce woods near Lake Isabelle, about four miles from town. The skin was prepared by Miss A. M. Heydweiller and is now in the Cornell University collection. Its measurements (W.-73.25, T.-59.8, and B.-9.4) and coloration are typical of the western race. Judging from the normal range this form must be considered as an accidental or at most a casual visitor in the vicinity of Churchill.

The writer wishes to thank Mr. James L. Peters, Curator of Birds, Museum of Comparative Zoölogy at Harvard College, who was kind enough to examine this specimen and determine its subspecific status.—FREDERICK M. BAUMGARTNER, *Laboratory of Ornithology, Cornell University.*

Connecticut River, New Hampshire, Notes.—I can find very few notes relative to the Connecticut River as a Duck migration highway. Glover M. Allen in his 'Birds of New Hampshire' has given a few records embracing ponds and lakes in this and nearby vicinities. Hence it seems that the following notes, made in 1935, might be worthwhile.

Anas p. platyrhynchos. MALLARD.—One April 7.

Anas rubripes tristis. BLACK DUCK.—By far the most common species on the river

at any time, and incidentally breeds. Fifty-four seen March 31; one hundred and seven plus, April 7; about thirty April 14.

Nettion carolinense. GREEN-WINGED TEAL.—Ten April 7.

Spatula clypeata. SHOVELLER.—A single male flying past April 7.

Nyroca marila. GREATER SCAUP.—One seen March 31; thirty-three April 7, a flock that flew up-river when flushed from mid-river.

Glaucionetta clangula americana. AMERICAN GOLDEN-EYE.—Two, a male and female, watched close to shore April 14.

Somateria mollissima dresseri. AMERICAN EIDER.—Three each date, March 31 and April 7, all males.

Oidemia americana. AMERICAN SCOTER.—A single male April 7.

Mergus merganser americanus. AMERICAN MERGANSER.—Three males, April 14.

Mergus serrator. RED-BREASTED MERGANSER.—Three, April 7.

Larus argentatus smithsonianus. HERRING GULL.—Four adults stayed about the mouth of Mill Brook emptying into the river, from about March 25 and for the month following. On March 17, a single adult bird was seen riding a debacle ice floe in mid-river between Westminister, Vermont, and Walpole, N. H., heading down river toward Westmoreland where the above Gulls were recorded.

All the Duck notes herein were made at Westmoreland, at one spot in the river embracing not over two hundred yards along shore.—LEWIS O. SHELLEY, *East Westmoreland, N. H.*

Some Wintering Birds of Franklin County, Mass.—Slightly eastward of Mt. Hermon School in East Northfield, the farm piggery is located, a building of several sheds in a pasture. Garbage of the school is fed to a mixed herd in the large, open pen. Starlings and Crows in considerable numbers are attracted by the constant feast, which probably accounts for a flock of Cowbirds and a single Red-winged Blackbird that lingered throughout the fall of 1935 and are now remaining for the winter. Up to January 11, 1936, the winter was quite an open one with very little snow and but one cold period. My brother, John L. Bagg of Greenfield, first noticed the unusual visitors on December 12, 1935.

The Cowbirds he found remained fairly close to the neighborhood, sometimes flying to nearby cowbarns of the school, at other times along the open roadside. On December 22 he counted nine males and seven females or immature birds on the ridgepole of the sheds. While mingling with the Starlings, they kept for the most part in a group by themselves. Associating with them the female Red-wing could usually be seen.

On January 25 wondering whether they were able to survive the unusually severe snowstorm of January 11 when two feet or more of snow fell, followed by sub-zero temperatures, we visited the piggery. As we approached the pen, Starlings were flying back and forth, dropping to feed among the pigs, some of them frequently alighting on their backs. One medium sized animal, we noted, held six Starlings, others three or four. On this occasion, two male Cowbirds and the single Red-wing were all we could find.

Suddenly our attention was riveted to a large bird, gliding swiftly on outstretched pointed wings, about six feet over the pen in our direction. As it swept up overhead, the black mustachios confirmed our suspicions of a Duck Hawk (an adult male judging by the size and plumage). Back and forth he wheeled several times before making off, the large yellow feet showing plainly. We have had records of this Falcon in our valley for every month of the year with the exception of January, chiefly in the vicinity of the Mt. Tom ledge. The nearest nesting ledge, to our

knowledge, to the school is the Sugarloaf eyrie at South Deerfield, some fifteen miles distant down river. This congregation of Starlings must be his winter larder.–Aaron C. Bagg, *Holyoke, Mass.*

Some Late Spring Records of Water Birds in Connecticut.—Looking over my note-books for some years back I find that there are a number of unusually late occurrences of various water birds. These species are common on Long Island Sound in winter or migrations, but most of them are mainly, if not entirely, gone by the latter part of April. Occurrences in May or June therefore seem worthy of record.

Gavia immer immer. Common Loon.—Usually found until after the middle of May, but one on June 7, 1930, is considerably later than I have ever seen it before.

Gavia stellata. Red-throated Loon.—On May 17, 1924, one was found on Fairfield Beach. It was resting some distance from the water, and was so exhausted that I approached it slowly to a distance of six feet before it moved awkwardly down to the water and swam out a little way. As soon as I went back the bird returned to the shore to rest again. It was in full summer plumage, the red mark on the throat showing plainly.

Colymbus auritus. Horned Grebe.—In 1928 and 1929 a few individuals of this species were seen along Fairfield Beach in June. In 1928 I saw them on June 9, 17, 18 and July 1, and in 1929 on June 13, 18 and 26. In both years I was unable to look for them after July 1, as I had to leave for summer work in western New York.

Branta canadensis canadensis. Common Canada Goose.—A flock of nine was seen on the east side of the Housatonic River near Devon, Conn., on May 29, 1932. The shore is marshy at this point; some of the birds were swimming and others standing among tufts of grass. Because of the marsh and the high tide I was unable to approach closer than fifty yards, and the birds were undisturbed by my presence.

Nyroca affinis. Lesser (?) Scaup Duck.—A drake was seen on a pond at Wallingford, Conn., May 25, 1929. Because of its inland occurrence it was assumed to be the Lesser Scaup.

Glaucionetta clangula americana. American Golden-eye.—A pair seen at Fairfield Beach on May 24, June 3 and June 7, 1930. On May 24 they were resting side by side on the beach and allowed me to approach within twenty-five feet.

Clangula hyemalis. Old-squaw.—The occasional occurrence of this Duck along the Connecticut coast in summer is known, but I believe that it is not so rare as has been supposed. Small flocks were seen at Fairfield Beach until June 24, 1923, July 1, 1928 and June 26, 1929. In all these years I was unable to remain in the vicinity after July 1, but I have no doubt that they remained all summer.

Somateria spectabilis. King Eider.—This bird is rare at any season in Connecticut, but the occurrence of one in May, 1934, was most unusual. The bird was a drake in eclipse plumage, and was seen almost daily from May 18 to 26 on the Penfield Reef, Fairfield Beach. When the tide was low it was generally to be found standing on the reef. On the first occasion that I saw it, the hazy atmosphere made me unable to make out anything but a large dark-colored Duck of unfamiliar appearance, flying away at my approach. On the second occasion, May 20, I made out white patches on either side of the lower back, a good field mark for the species, though I did not know it at the time. On each later occasion I got a better opportunity to observe it, till its final appearance on May 26, when, with the aid of a small telescope I was able to examine the plumage in detail and draw a sketch of it. On this occasion several others observed the bird with me, including Dr. Winsor M. Tyler.—Aretas A. Saunders, *Fairfield, Conn.*

Unusual Birds in Western North Carolina.—Apparently since 'Birds of North Carolina' by Pearson, Brimley and Brimley came out in 1919, aquatic bird life in Buncombe County which is in the mountains has changed appreciably. I have found some formerly rare Ducks to be of regular occurrence here although from reports it appears that Ducks are not at all common this year on Lake Ashnoca near Asheville, Buncombe County, North Carolina. All of the below mentioned Ducks have been seen here before in recent years, and sometimes in considerable numbers. Following is a list of rarer birds seen in this locality since fall:

Mareca americana. BALDPATE.—One adult male in flock of Scaups on November 7, 1935.

Nyroca collaris. RING-NECKED DUCK.—Fairly common from November 7 to December 20, 1935.

Nyroca affinis. LESSER SCAUP.—Common throughout November, 1935. One female taken November 7, without any white on the face whatsoever.

Glaucionetta clangula americana. AMERICAN GOLDEN-EYE.—One male on December 2, 1935.

Charitonetta albeola. BUFFLEHEAD.—One male on December 2, 1935.

Lophodytes cucullatus. HOODED MERGANSER.—One female on December 2, 1935. In the last few years this bird has been reported commonly after wet weather.

Mergus merganser americanus. AMERICAN MERGANSER.—One female on November 16, 1935.

Pandion haliaëtus carolinensis. OSPREY.—One seen about the lake at intervals in early fall, 1935.

Fulica americana. AMERICAN COOT.—Not uncommon in late October and early November. An immature bird was taken alive on October 28, 1935, and subsequently made into a skin upon its death from disease.

Megaceryle alcyon alcyon. BELTED KINGFISHER.—One bird remaining throughout the winter.

Corthylio calendula calendula. EASTERN RUBY-CROWNED KINGLET.—This bird has been present throughout the winter in small numbers in the alders along the lake shore. I took one male on January 16, 1936. The previous latest date for this region that I have been able to locate is November 6.

Dendroica p. palmarum. WESTERN PALM WARBLER.—Large migration in last half of October, 1935. One collected on October 22. This bird is known here as a rare spring migrant.

Euphagus cyanocephalus. BREWER'S BLACKBIRD.—On the school campus on November 19, 1935, I noticed what I believed to be several Rusty Blackbirds which are not uncommon here. They were females, and fortunately they were tame enough so I could approach so close as to see their dark eyes with my naked eye, although I used a pair of 10x glasses to make doubly sure of their identity. Brewer's Blackbird is, of course, extremely rare anywhere in the state.

Melospiza georgiana. SWAMP SPARROW.—Fairly common this winter in nearby marshes. I am not aware of any other winter records for the region.—ROBERT B. WALLACE, *Asheville School, Asheville, North Carolina.*

Notes on the Breeding Birds of Southeastern Ohio.—The southeastern quarter of Ohio, comprising 22 counties, is entirely of unglaciated Allegheny Plateau. For many years the writer has been making intensive studies of the breeding bird populations throughout this entire area. During the last two breeding seasons he has been fortunate to reside and engage in biological work in the center of this

unglaciated region and extensive week-end trips have covered the important habitat types in each county.

Except for parts of the western third, this unglaciated area has received little ornithological attention, especially during the breeding season. Characteristic birds breeding in this region include: Broad-winged Hawk, Northern Pileated Woodpecker, Bewick's Wren, Eastern Mockingbird, Worm-eating Warbler, Kentucky Warbler, Hooded Warbler, Northern Pine Warbler, Northern Prairie Warbler, Summer Tanager, Eastern Lark Sparrow and Bachman's Sparrow. A number of southern forms breed forty to ninety miles farther north in the state in this unglaciated plateau region than in the relatively level glaciated country to the west. The average size of the known list of breeding birds for all Ohio counties is 103 species. In the whole state 181 species are now known to nest or to have nested. These 22 unglaciated counties average 101 breeding species each, while the 17 glaciated Allegheny Plateau counties, being well supplied with northern and aquatic habitats, average 19 more or 120.

Some brief notes on the breeding birds of this area are listed below:

Ixobrychus e. exilis. Eastern Least Bittern.—Three pairs nested in 1934 at a cat-tail pond at South Zanesville, Muskingum County, and two pairs on a calamus pond near Conesville, Coshocton County. Several pairs nested in 1935 at a large cat-tail marsh two miles east of Cambridge, Guernsey County.

Anas p. platyrhynchos. Common Mallard.—Two broods were raised on the cattail marsh east of Cambridge, Guernsey County, in 1935.

Anas rubripes tristis. Common Black Duck.—A brood of five young was produced at the above marsh in 1935. Both Duck species are almost unknown as breeders in the unglaciated counties.

Buteo p. platypterus. Broad-winged Hawk.—Found to occur regularly in summer in ten counties: Jackson, Vinton, Hocking, Scioto, Lawrence, Gallia, Meigs, Washington, Noble, Monroe. Two breeding specimens collected along the Ohio River near Marietta in Washington County.

Rallus e. elegans. King Rail and *Rallus l. limicola.* Virginia Rail.—Both species nested in 1934 and 1935 at a cat-tail pond near South Zanesville and in a cat-tail marsh east of Cambridge. Both species are almost unknown in the unglaciated counties.

Cryptoglaux a. acadica. Saw-whet Owl.—Adult present in June and July 1934, two miles north of Mt. Sterling, Muskingum County.

Ceophloeus pileatus abieticola.—Northern Pileated Woodpecker.—Four nests were found and 57 adults seen in Muskingum County in 1935.

Riparia r. riparia. Bank Swallow.—Almost absent in unglaciated Ohio. A colony of 162 pairs nested in a sand bank two miles south of Dresden in Muskingum County in 1935.

Telmatodytes palustris dissaeptus. Prairie Marsh Wren.—Twelve pairs nested in a calamus pond near Conesville, Coshocton County, and nine pairs in the cattail marsh near Cambridge, Guernsey County in 1935.

Cistothorus stellaris. Short-billed Marsh Wren.—Twenty-six pairs nested near Roseville (on Perry-Muskingum county line), and nine pairs two miles southwest of Adamsville, Muskingum County, in 1934. Absent from both localities in 1935.

Mimus polyglottos. Eastern Mockingbird.—Locally common north to the National Road (Zanesville-Wheeling) but usually rare or absent north of that line. In 1934 and 1935, 52 pairs were located in Muskingum County, twelve in Noble County, 18 in Guernsey County and 23 in Morgan County.

Vireo g. griseus. WHITE-EYED VIREO.—Known northern breeding limit extended to include Licking, Coshocton, Tuscarawas, Harrison and Jefferson counties.

Protonotaria citrea. PROTHONOTARY WARBLER.—Fifteen pairs nested at Ellis Pond, Muskingum County in 1934 and 1935, and one pair along the Muskingum River near Lowell, Washington County, in 1935.

Vermivora chrysoptera. GOLDEN-WINGED WARBLER.—No nests located but adults present in summer of 1935 in several localities of Monroe and Morgan counties.

Compsothlypis americana pusilla. PARULA WARBLER.—Two pairs present during the summer of 1935 on either side of the Perry-Muskingum county line, nesting in hemlocks along the banks of Jonathan Creek gorge.

Dendroica d. discolor. NORTHERN PRAIRIE WARBLER.—A pair nested in 1935 in a pastured crab apple thicket near Duncan Falls, Muskingum County (male collected). This extends the known Ohio breeding range at least thirty miles to the northward.

Setophaga ruticilla. AMERICAN REDSTART.—Though commonly regarded as rare or absent in the unglaciated counties in summer, this species was found to be rather common in several localities in Monroe, Washington, Muskingum and Scioto counties.

Dolichonyx oryzivorus. BOBOLINK.—Nests abundantly in old lake basins and swamp beds in northern Muskingum County south to within six miles of Zanesville. This is the most southern breeding locality in the unglaciated counties.

Icterus spurius. ORCHARD ORIOLE.—Found to be fairly common locally in parts of Muskingum, Morgan, Athens, Jackson and Scioto counties.

Piranga r. rubra. SUMMER TANAGER.—Found to be rather common, though somewhat local, in all of the southeastern counties north to the National Road (Zanesville-Wheeling) but in very small numbers north of that line, though breeding north to Coshocton, Tuscarawas, Carroll and Columbiana counties.

Passerherbulus h. henslowi. WESTERN HENSLOW'S SPARROW.—Eighty-two pairs were found in 11 colonies in Muskingum County in 1935.

Chondestes g. grammacus. EASTERN LARK SPARROW and *Aimophila aestivalis bachmani.* BACHMAN'S SPARROW. Both species were found during 1935 breeding in at least a dozen localities of Muskingum County.—LAWRENCE E. HICKS, *Ohio State University, Columbus, Ohio.*

Records of Unusual Birds in Eastern Wisconsin.—During the year 1933, three unusual birds were seen in the valley of the Lower Fox in eastern Wisconsin. These were the American Egret (*Casmerodius albus egretta*), the Tufted Titmouse (*Baeolophus bicolor*), and the Dickcissel (*Spiza americana*). As far as can be learned from published records for the state, these birds had not previously been found as far north in Wisconsin as the region indicated.

On August 15, a local newspaper reported "White Storks" in the river bottoms below Kaukauna. Under observation, the birds proved to be American Egrets, nine in number. A close approach was not possible, but with the aid of binoculars, the black feet and yellow beaks were clearly seen. For a month the flock occupied the broad river shallows below the city, and the birds were seen frequently during that period. While the American Egret was at one time not uncommon in southern Wisconsin, it is now rare, and has not been previously recorded from the Fox River Valley.

The finding of the Tufted Titmouse (*Baeolophus bicolor*) in Outagamie county extends the known range of this species one hundred miles north of its former limit in the state. The occurrence of the bird here adds to the body of evidence already

accumulated, which indicates that the range of the Titmouse is gradually extending northward. The first record for Wisconsin was that of N. C. Gilbert, who in 1900, collected a bird near Madison. It was not until 1921, however, that the species was known to be established as a permanent resident in the southern part of the state. In that year Stoddard took a pair in the Wisconsin River bottoms. H. M. Schorger obtained the first breeding records in 1925; this was also in the valley of the Wisconsin. The appearance of the Titmouse locally was first noted on December 25, when a single bird came to a window shelf. For a month the same individual fed regularly each day, usually appearing just after daybreak, and again about noon. At a distance of less than two feet, the bird was observed scores of times.

The third bird, the Dickcissel (*Spiza americana*) was found on July 15, in the shrubbery of a low, cut-over swamp near Appleton. The bird was recognized instantly, as the writer had enjoyed an intimate acquaintance with this species in central Illinois. A quarter of an hour was spent in watching this individual, which was a male, in song. Two hours later the bird was observed at almost the same spot where it was first seen. It was not possible to return for further observation, but it seems not unlikely that a pair was nesting in the vicinity.—Mrs. Walter E. Rogers, *911 E. North St., Appleton, Wisconsin.*

Notes on the 1935 Spring Migration Near Billings, Montana.—In comparing my 1935 bird notes with the spring migration data in 'A Distributional List of the Birds of Montana' by Saunders (1921), I find a few records which are earlier than those given by that writer. Inasmuch as I am not aware that data on spring migrations in Montana have been published subsequent to 1921, I submit the following:

Wilson's Phalarope: On May 4 seven were found in a marsh three miles west of Billings. Observed three performing their "spinning" act on May 11 at the same marsh. On May 17 found two at the farm of the Polytechnic Institute. Earliest date given by Saunders, May 21, 1889.

Desert Sparrow Hawk: On the morning of February 9 I found two perched in a tree. Saunders, February 28, 1910.

White-throated Swift: On April 19 eight were observed at the Rim Rocks, three miles west of Billings. Earliest date given by Saunders, May 19, 1911.

Yellow-headed Blackbird: On May 4 observed about one hundred of these birds in a marsh three miles west of Billings. Saunders, May 7, 1912.

Bronzed Grackle: Observed twelve on April 24 near the Polytechnic farm. Earliest date given by Saunders, April 25, 1895.

Cassin's Purple Finch: Observed a flock of twenty on March 24. Earliest date given by Saunders, April 4, 1894.—Cecil M. Welch, *Polytechnic Institute, Polytechnic, Montana.*

Further Notes on Montana Birds, 1935.—Hungarian Partridge: On November 11 I observed three flocks of these game birds in Carbon County, aggregating a total of about one hundred individuals. At the time when Saunders (1921) made his study of Montana birds these birds were evidently very rare as he mentions only one bird. This was found dead in the summer of 1915.

Rocky Mt. Screech Owl (Gray phase): A pair nested in Mr. E. T. Eaton's orchard, three miles west of Billings, rearing three young. On July 8 I saw both parent birds and two of the young perched in a tree.

Western Wood Pewee: On or about August 2 I found the nest of this bird on the Polytechnic Campus, with one young bird, nearly full-grown, in the nest. The young bird was in the nest on August 4. That night a very heavy wind arose and

on the following morning I found the nest on the ground, with no trace of either the young bird or of the parents. It would be interesting to know what had become of them. The nest was placed on a very small horizontal limb seven feet high.

HARRIS'S SPARROW: On October 19, at Polytechnic, I found a fairly large flock of sparrows feeding in a large weed patch. A careful search revealed at least two or three Harris's Sparrows in the group. Mention is made of this inasmuch as Saunders (1921) found them to be a "rare fall migrant" and "very rare in spring."

GREEN-TAILED TOWHEE: On August 20, there were observed several Green-tailed Towhees with a group of Arctic Towhees. Observation made in a thicket of small shrubs and trees in Stillwater County.

LARK BUNTINGS: On a trip through the wheat country near Broadview on August 4, there were encountered hordes of grasshoppers. The country roads were literally covered with these insects. Thousands of Lark Buntings and Desert Horned Larks were found in this territory, evidently attracted by the grasshoppers.

CAÑON WREN: This bird is not listed by Saunders (1921). I found two birds of this species at the Rim Rocks, three miles west of Billings, on April 7. Their beautiful song attracted my attention at once. One seen in the same place on April 14; two or three on April 19; and on December 1 I found one. The December bird was found one half mile from the place where the April birds were found.

WESTERN BLUEBIRD: My records contain only one mention of this bird. On June 30, near Absarokee, Stillwater County, from the car I saw a group of ten or twelve. I am quite positive they were Western Bluebirds. They were considered rather rare when Saunders was writing in 1921.—CECIL M. WELCH, *Polytechnic Institute, Polytechnic, Montana.*

Additions to the List of the Birds of Zion National Park.—Since the publication of C. C. Presnall's list of 'The Birds of Zion National Park' (Proc. Utah Acad. Sci. Arts and Letters, 1935, pp. 197–210) several additions to the list have been made. Two of these have been submitted for publication as separate notes and the four remaining are presented here.

Glaucidium gnoma pinicola. ROCKY MOUNTAIN PYGMY OWL.—The writer saw one of these little Owls sitting in a dead pine tree about two hundred yards from the east portal of the Mt. Carmel tunnel on January 13, 1936. It was at high noon, and the sun was shining brightly, but the little fellow sat there, wide awake, head turning constantly from side to side. I watched it for several minutes with 8x binoculars. A half hour later, when I again passed that way, the bird was gone. This was at an altitude of about 5,200 ft.

Another Pygmy Owl was seen by the writer just outside of the south boundary of the park, in the lower end of Zion Canyon. Again it was in daylight, on a bright warm day, and the Owl was perched in an exposed position near the highway, in a small cottonwood tree. When approached, it flew up the canyon toward the park and perched in a larger cottonwood. This is at an altitude of about 4,000 feet.

Sitta canadensis. RED-BREASTED NUTHATCH.—During the invasion of large numbers of Red-breasted Nuthatches in southern Utah (Presnall, Condor, vol. XXXVIII, Jan.–Feb. 1936, pp. 44–45), several were seen on the east rim of Zion Canyon, at an elevation of 6,300 feet, September 18, 1935. It is very likely that they were common all over the plateaus which form the higher parts of the park.

Nannus hiemalis pacificus. WESTERN WINTER WREN.—On November 28, 1935, C. C. Presnall and the writer saw a Winter Wren in a tangle of brush and weeds about a spring near Springdale, but it was not until January 1, 1936, that Henry

Grantham, engaged in bird-banding, saw one actually within the park boundary. It was in a brushy place along the Virgin River in the lower end of Zion Canyon.

Amphispiza nevadensis nevadensis. NORTHERN SAGE SPARROW.—Presnall has seen the Sage Sparrow in the southwest part of the park at various times during the last two or three years, but did not include it in his list because it was not certainly identified. On October 17, 1935, the writer saw one in the "Petrified Forest" in the southwestern part of the park, but it was not until a specimen was taken near Hurricane, Utah, that it was certainly identified. It has been seen only in those areas which are considered Lower Sonoran.

These four records, with the two already reported, the Brown Thrasher (*Toxostoma rufum*) and the Golden-crowned Sparrow (*Zonotrichia coronata*), make a total of 146 species and subspecies recorded from the park to date.—W. S. LONG, *Zion National Park, Utah.*

A Note on the Collecting of W. W. Brown, Jr., in Chiriqui.—Work I have had in hand during several years past has necessitated the frequent use of Bangs's invaluable paper "On a second collection of birds made in Chiriqui, by W. W. Brown, Jr."[1] In the initial stage of my studies, the information regarding localities and elevations in this paper seemed to leave little to be desired, especially as the introduction included an account of Brown's itinerary.

As my work progressed, I recognized the presence of the Caribbean element among the species recorded from the "Caribbean slope of the Volcan de Chiriqui," but failed to see the significance of this fact. Then I acquired a personal acquaintance with the region in which Brown worked, and came to realize that such records as "*Bolborhynchus lineolatus* (Cassin). Two males, Caribbean slope of Volcan de Chiriqui, 2000 feet," "*Thamnistes anabatinus Scl.* and *Salv.* Two males, Caribbean slope of Volcan de Chiriqui, 2000 and 3000 feet," "*Rhamphocænus semitorquatus* Lawr. Two males, Caribbean slope of Volcan de Chiriqui, 1000 and 2000 feet," "*Myrmelastes immaculatus* (Lafr.) One adult female, Caribbean slope of Volcan de Chiriqui, 2000 feet," and "*Xiphorhynchus grandis* Cherrie. One adult male, Caribbean slope of Volcan de Chiriqui, 700 feet" were erroneous either as to elevation or as to locality, in as much as other lesser mountain masses intervene between the Volcan de Chiriqui and the elevation of 3000 or 700 feet on the Caribbean slope.

An inquiry directed to Mr. Ludlow Griscom brought no new facts to light regarding the collection nor Brown's itinerary. I then addressed the collector himself, and from him obtained a very good account of his collecting experiences. One paragraph of his letter contained the solution of the problem. "Another expedition we made, we followed the trail from Boquete to Chiriqui Grande on the Caribbean Coast. It took us if I remember [correctly] five days to reach the Caribbean Coast. I collected along the trail to close to Chiriqui Grande or roughly speaking about 700 feet altitude. I did no collecting at Chiriqui G[rande]."

In the reading of this letter, it becomes obvious that several "Caribbean slope of Volcan de Chiriqui" species were taken on this trip to Chiriqui Grande on the Caribbean slope of the Cordillera de Talamanca (of which the Volcan de Chiriqui is a peak), and not on the volcano itself. It is difficult to be exact in this matter, but certainly all specimens taken on the Chiriqui Grande trip at elevations below 4000 feet, and probably some taken at higher elevations, should have been labeled as coming from the Caribbean slope of the Cordillera de Talamanca, Bocas del Toro, and not from the Volcan de Chiriqui.

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[1] Proc. N. E. Zool. Cl., III, 1902, 15–70.

A misunderstanding of the geography of this region is apparently not confined to Brown, since Griscom[1] gave "Caribbean slope of Volcan de Chiriqui" as the locality for a specimen of *Leucopternis princeps*, which was taken by Kennard and by him recorded[2] from "Boquete Trail, 3100 feet." Since the introduction to the paper by Kennard and Peters makes it clear that the party did not cross the continental divide, it is evident that Griscom's emendation serves only to obscure the facts.—M. E. Davidson, *California Academy of Sciences, San Francisco, California.*

[1] Bull. Mus. Compr. Zool., LXXVIII, 1935, 300.
[2] Proc. Boston Soc. N. H., 38, 1928, 449.

RECENT LITERATURE.

Murphy's 'Oceanic Birds of South America.'—In two sturdy volumes[1] Dr. Robert Cushman Murphy's long looked for 'Oceanic Birds of South America' is before us and constitutes a fitting climax to his years of study of the birds of the sea and a monument to himself. We have followed his activities in this field with much interest since the publication of the first results of his trip to South Georgia Island, which appeared in the pages on 'The Auk' in 1914, and it is a pleasure to congratulate him upon the completion of the present splendid work.

There have been many elaborate publications on the birds of various countries as well as of various States of the Union but nothing, we believe, at all comparable to the present work devoted exclusively to the water birds of any region and it stands unique in several respects.

The arrangment of the subject matter seems excellent. It is divided into two parts (I) The physical Environment and (II) The Oceanic Birds. Part I begins with a brief introduction which sets forth the major part that Dr. L. C. Sanford and Mr. F. F. Brewster have played in obtaining for the American Museum of Natural History the collections upon which this report is primarily based and Mr. Brewster's generosity in making possible the publication of the volumes. There follows, very fittingly, an autobiography of the Field Worker who with his wife did the actual collecting—Rollo H. Beck, and his narrative of the expeditions covering 1912 to 1917.

Dr. Murphy follows with an account of his own explorations on South Georgia Island, 1912–1913, and Peru, 1919 and 1924, and the trips of Correia, Murphy and Heilner, Chapman, Tate, Chapin, etc., which procured material or data for the Museum that has been used in the work.

Under the head of Geographic Background the author discusses the meteorology and hydrology of the South American coasts. In the former, rainfall and winds are considered in much detail with relation to their effect on bird life, while an interesting section treats of hurricanes and their part in carrying sea birds far from their normal habitat. Under hydrology there is a detailed discussion of the ocean currents a subject to which Dr. Murphy has given much attention. The food content of sea water is also discussed and the greater amount of nutritive material found in cold as compared to warm water, the greater salinity of the latter and the greater number of coexisting generations of lower forms of life which it contains; all of which are factors that are concerned with the greater amount of invertebrate life in the southern seas and the consequent abundance of their oceanic birds.

Dr. Murphy then divides the oceans of the Southern Hemisphere into more or less definite zones—Antarctic, Sub-Antarctic, Sub-Tropical, Tropical—listing the characteristic species of each, and finally shows how the ocean currents distort the boundaries of these zones and how complex is the avifauna of some of these currents, notably the Humboldt Current which skirts the coast of Peru veering away to the west at the Equator toward the Galapagos, and carrying Antarctic forms far to the northward. It is probably responsible for the occurrence of a Penguin on the Gala-

[1] **Oceanic Birds | of South America | A Study of Species of the | Related Coasts and Seas, Including | the American Quadrant of Antarctica | Based upon the Brewster-Sandford | Collection in the American Museum | of Natural History | By | Robert Cushman Murphy | Illustrated from Paintings by Francis L. Jacques | Photographs, Maps, and other Drawings | 1936 | American Museum of Natural History | New York | Vol. I, pp. i–xxiv + 1–640. Vol. II, 641–1245. Plates 16–72, text figs. 80. Price $10.50 post paid. Amer. Mus. Nat. Hist., 77th St. and Central Park W.. N. Y. City**

pagos, the only Penguin known from so far north as the Equator. The source and relationship of some of the birds found over certain ocean currents is puzzling and other birds of the southern seas which do not lend themselves to any of the regions outlined by our author are designated by him as "zoneless birds." Such is the Tern, *Sterna vittata*, which nests on the Antarctic Archipelago but seems like a sedentary representative of the Arctic Tern a boreal species which winters in the Antarctic. Other species showing similar puzzling distribution are *Sterna hirundinacea*, *Larus dominicanus* and *Phalacrocorax olivaceus*. Next comes a lengthy and extremely interesting "Ornithological Circumnavigation of South America" beginning with the northern (Caribbean) coast and continuing down the east coast and up the west including all of the coastwise islands. This carefully compiled account presents the physical features of the various sections of the coast line and their climate with lists of the characteristic shore and sea birds and bits of their life histories. There are many pertinent quotations from various authors and explorers which add to the interest of the story and indicate how thoroughly Dr. Murphy has mastered the literature of his subject. The accounts of South Georgia Island and the coast of Peru are from the author's personal experiences, the latter made familiar to many of our readers in his 'Bird Islands of Peru' and his lectures on the region.

Part II comprises the systematic portion of the work, an admirable series of life histories beginning with the Penguins and following the order of Wetmore's classification. The author tells us that he has "sought to include only birds which have close association with salt water" so that while all the South American species of such groups as the Penguins, Petrels, Man-o-war Birds etc., are included, he has, in other groups, been forced to choose more or less arbitrarily on the above basis, as the line delimiting "oceanic" birds cannot be very clearly drawn. The biographies are very well done. There is a word picture of the bird in life, its historic and economic status, field observations by members of the Museum expeditions, full descriptions with comments on distribution, migration, habits and behavior, etc.

While it is impossible in the limited space at our disposal to even mention all of the species treated we select a few items from the mass of interesting material that is presented. Under the Penguins the author discusses the origin and history of the group as set forth by Wiman, and by Lowe, calling attention to the errors of the former and presenting the objections to the latter's theories recently advanced by Dr. W. K. Gregory and himself. Lowe considered that these curious birds were not descended from flying ancestors but came along a different line from that of the flying birds. Gregory and Murphy, however, are convinced that their ancestors did fly and were birds with normal wings. Much interesting evidence is presented.

Dr. Murphy's studies of the curious Steamer Ducks of Patagonia are full of interest. These birds have been the subject of long controversy. Some authors have regarded the flightless individuals as of a distinct species from those which have the power of flight, while others contend that the former were able to fly when young but lost the power later in life. With over one hundred specimens at his disposal Dr. Murphy is convinced that there are three distinct species: a flightless one from the Falkland Islands; another flightless species ranging from Chiloe Island to Cape Horn and a third flying species occurring in all parts of the ranges of the other two. Curiously enough the downy young of the three forms are more distinctive in appearance than birds in any later plumage. In discussing the feeding habits of the Skimmer, Dr. Murphy endorses the views of various authors who claim that the bird catches small fish or other prey between its mandibles in the usual way. Others have stated that it feeds on minute organisms which it scoops up from the water as it ploughs its

bill along the surface and that the peculiar bill has developed in some way to aid such feeding! Dr. Murphy suggests that the brightly colored bill is skimmed along the surface as a lure, somewhat like a trout fly, and that curious fish rise to see what it may be and the bird retracing its course snaps them up.

These life histories are full of interesting reading and abound with original information.

The work is illustrated by 16 colored plates by Francis L. Jacques who visited the coast of Peru and the South Pacific to obtain sketches for his backgrounds and to see many of the birds in life. They form a beautiful series of pictures and, like others of the artist's paintings, are all group compositions usually with many birds often of several species, rather than individual portraits.

There are also 72 beautifully printed halftone plates, from photographs, covering both sides of extra heavy coated paper, and 80 text figures. A well prepared bibliography and an adequate index complete this notable work of which all concerned in its production may well be proud.

While the proof-reading seems to have been very well done there are a half dozen errata listed on p. xxiv and apparently there is another error on p. 472 where it is stated that "the Puffininae make up the bulk of the family Hydrobatidae." Family "Procellariidae" is apparently intended.—W. S.

Swann's Monograph of the Birds of Prey.—Another part of this notable work[1] appeared in December, 1935, carrying us through the Kites and their allies and the genus *Falco*, leaving only the remainder of the Falcons and the Ospreys to be treated. It seems likely therefore that it will be completed during the present year. Colored plates of the Batteleur and the Sea Eagle and a photogravure of a Kite's nest are the illustrations accompanying this part.—W. S.

Aymar's 'Bird Flight.'—The basis of this interesting volume[2] is the two hundred photographs of flying birds and as the author says, while there have been many books treating of the flight of birds there has been none "devoted exclusively to allowing the infallible camera to state what actually happens in the many different types of flight of the various species. That is the real justification for this book," and he adds that "the book belongs to the men whose perseverance and skill have produced the photographs of which it is composed."

At the same time the author is responsible for the conception of such a work, for the selection of the pictures and for the discussion of the published information on the several phases of bird flight. He has had before him practically all of the important works dealing with flight and his chapters on Evolution, Biology, Migration, and Aerodynamics present an excellent summary of the latest views on these subjects. At the end of each chapter, and sometimes scattered through it, are photographs illustrating points connected with its subject matter with explanatory text below or on adjacent pages. Owing to the fact that the type used in the main text and in these explanatory paragraphs is of nearly the same size, we sometimes find it difficult to see where one stops and the other begins. Under the picture of the Black Skimmer we note the old belief that the bird "scoops up" its food from the surface of the water and that the peculiar bill is in some way an adaptation for this sort of feeding. This has been questioned by several authors in 'The Auk' (Arthur, Stone, etc.) and es-

[1] A Monograph of the Birds of Prey. Part XIII, December, 1935. By H. Kirk Swann, edited by Alexander Wetmore. Wheldon and Wesley, Ltd. 2, 3 & 4 Arthur St., New Oxford Street, W. C. 2, London. Pp. 257–352, 3 plates.

[2] Bird Flight. Written and Designed by Gordon C. Aymar. A Collection of 200 Action Photographs. Dodd, Mead & Co. 1935. Pp. i–xii + 1–234. Price $4.00

pecially by Murphy in his 'Oceanic Birds of South America.' It is also stated that the Swift uses its wings alternately in flight, a theory that has not yet been proven. There are a few other ornithological misstatements or assumptions but they are not important.

The series of photographs which the author has brought together is truly remarkable: the frontispiece of an Egret taking off, by Middleton; Arthur's diving Coot; his own flying Mallard; Bailey's flying Snowy Owl; and Schroder's diving Pelican are among the more notable, though it is hard to make selections. There is also an astonishing photograph of a Mourning Dove with wing feathers fully expanded, taken by H. E. Edgerton and Kenneth Germeshausen in one 75,000th of a second. These pictures are worthy of very careful study as they throw much light on all phases of bird flight especially the position of individual feathers in various sorts of wing action.

The presentation of the theories of Curry and Lilienthal on soaring are interesting and illustrate the many factors that must be considered in such discussions. Mr. Aymar has given us a popular book that presents one of the most attractive and puzzling of the bird's activities in a way that can be understood by all, while the illustrations will be of the greatest interest to photographers as showing once more the possibilities of their craft, while the artist should find much of value to him in his efforts to portray accurately the bird in flight. The chapter on aerodynamics covers a phase of the subject about which ornithologists know but little. It is extremely interesting but we are not competent to discuss it. Apparently the author is thoroughly familiar with this phase of flight. There is a good bibliography but unfortunately it is arranged alphabetically by titles instead of by authors so that it is difficult to find a given work.—W. S.

Brooks and Wetmore on the Auks and their Allies.—The 'National Geographic Magazine' continues its series of illustrations and accounts of North American Birds[1] with an admirable sketch of the Alcidae. Brooks depicts the various species on eight colored plates, most interesting of which is his conception of the Great Auk. While it resembles to some extent Fuertes's drawing used on the 'Auk' cover in 1913 and 1914, both bill and wing are relatively smaller and the same is true when compared with the present 'Auk' design prepared by Fuertes at the request of the A. O. U. Council which was dissatisfied with his first effort and desired a more "conventional" Auk.

It is interesting to have the ideas of different artists as to what the bird really looked like for as the lovable and versatile Fuertes wrote upon submitting his second attempt: "nobody lives who knew the beast and there are so more to see!" (cf. Auk, 1915, p. 144).

The text by Dr. Alexander Wetmore is fully up to his previous contributions to this series and is fully illustrated with photographic reproductions. The 'Geographic' is doing a splendid service in furnishing this series of papers, which will eventually form a standard 'American Ornithology' for general readers.—W. S.

Linsdale's 'The Birds of Nevada.'—This publication,[2] like preceding 'Pacific Coast Avifaunas' emanating from the Museum of Vertebrate Zoology of the University of California, constitutes a painstaking and reliable summary of the region of

[1] Birds of the Northern Seas. By Alexander Wetmore. Auks and their Northland Neighbors. By Maj. Allan Brooks.

[2] Cooper Ornithological Club | Pacific Coast Avifauna | Number 23 | The Birds of Nevada | By | Jean M. Linsdale | Contribution from the California Museum of Vertebrate Zoology | Berkeley, California | Published by the Club | February 7, 1936. Pp. 1–145. Price $4.00. W. Lee Chambers, Bus. Manager, 2068 Escarpa Drive, Eagle Rock, Los Angeles, California.

which it treats. There is a brief sketch of physiography, an historical summary, a list of eighty "field workers," a map, and descriptive list of localities and a nominal list of the bird forms found in the state and following these the main text presenting a condensed statement of the character of occurrence of each form (or "kind" as the author prefers) in Nevada, followed usually by more details as to dates and localities. The A. O. U. 'Check-List' is followed for sequence but changes in the names or distribution of the Nevada forms are made in many cases, as a result of more accurate information. No synonymy or reference to place of publication of names are given, as the work is essentially geographic not systematic. There is a full bibliography, and we realize the relief that the author must have experienced when we find only about a dozen faunal papers published on the birds of the state! He has, however, taken the pains to examine all recorded specimens possible where identification in terms of modern knowledge was desirable and has thus eliminated many misidentifications. Three hundred and fifteen forms of which specimens have been procured are treated, as well as 23 others based upon sight identifications while a "hypothetical" list of 14 is appended.

Dr. Linsdale is to be congratulated upon an excellent piece of work adding as it does one more state list to the modern publications of this kind. While admittedly not complete it brings the subject up to date and makes it possible for others to carry on work intelligently.—W. S.

Griscom on Problems of Field Identification.—In this paper[1] Mr. Griscom has presented an interesting sketch of the development of ornithology and its present day tendencies which all should read. He compares the early days of discovery and description, the collecting period, the rise of field identification and the present era of specialization when "the living bird is more than ever the subject for both research interest and amusement, not the dead stuffed one," and the old time museum ornithologist has had to "retire to equatorial Africa, the wilds of South America or the mountains of New Guinea" as there is nothing left for *him* to do with North American birds. Likewise our author considers the making of big May lists useless from a scientific standpoint, as the results can be predicted in advance with an accuracy of 98%. Such work he regards as a hobby or outdoor pastime and not to be abandoned, but it is not scientific research, so far as well known regions are concerned.

As to the scientific value of sight records he says "No one sight record can ever be absolute proof" but a series may be, or a sight record by a series of competent observers. The present day arguments on the possibility of identifying closely related species in the field is of no scientific consequence in the region where the status of each has been accurately determined. "The real reason for such debate is that the present day enthusiasts wish to count both birds in their yearly list!"

With most of Mr. Griscom's conclusions and predictions we are in entire accord though there are doubtless many who will not agree. However, while it is true that the "old fashioned museum ornithologist is being replaced by the modern biologist" it seems to us that there will always be a need for the former. The collections in the museums must be intelligently cared for and after systematic study of skins has reached the limit of refinement—and it is rapidly approaching that goal—there are countless problems still to be solved from a study of skins and skeletons just as there are from field observation or aviary experiments. And furthermore there will probably always be those fitted for just this sort of work and no other.

We agree that the number of persons seriously interested in ornithology is increasing by leaps and bounds but we feel that there will be various limits beyond which

[1] Bird-Lore, January–February, 1936, pp. 12–18.

various groups will be unable to pass, either from lack of fundamental biological knowledge, from lack of time to equip themselves, or from lack of enthusiasm for concentrated study as opposed to a broad view of nature. We have for years urged young field ornithologists to make an exhaustive study of a single species but with very few exceptions they have preferred to wander widely and make a short acquaintance with a number of different species. We doubt, therefore, if a very large number of field students will reach the higher planes that the leaders attain. And so long as trained biologists, like Mr. Griscom and others, still "love to see how many birds they can see on a May 'big day'" their admiring satellites will continue to regard this as the height of ornithological achievement, even though it be really only a pastime and hobby. Mr. Griscom constantly contrasts the "amateur" and the "gifted scientist" which is really necessary in such a discussion but we have found this very dangerous ground upon which to tread; most "ornithologists" and especially "oologists" do not like anyone to separate the sheep from the goats!

One of the important and depressing factors in the development of technical ornithologists is: What is going to become of them when they are developed? To reach the higher planes which would seem to be their aim they must have a college training. A mere dilatante or a good field collector could become an "old fashioned museum ornithologist" but they cannot qualify as modern ornithological biologists. Unfortunately if a young man receives a college training, even in a college with a special ornithological course, it is difficult for him to find a position in which he can make a living. There are an increasing number of field positions opening up in connection with game preservation etc., for which the man most familiar with field work is the best fitted but here Government regulations too often step in and exclude all but those with a college education! Thus do well intentioned regulations defeat their own ends.

To return to field identifications: Mr. Griscom states that "those who wish to make sight records of scientific value must possess the proper qualifications and must acquire the reputation of possessing them." This cannot be too strongly emphasized. The young men who accompany men of Mr. Griscom's well known attainments in field identification, and see how easily they can identify off hand almost every bird that they see, think that the thing is very easy and armed with Peterson's 'Field Guide' they add many records of interest to their experience and that of others as well—a "Prothonotary Warbler" in Pennsylvania in March and an "Olive-sided Flycatcher" in the same month sitting by a spring house wagging its tail! (Both actual reports!) If we regard field lists wholly as a game it probably does not make much difference what sort of identifications are made as we shall have to reject the list *in toto* so far as any scientific value may go, but we should be very sorry to see this come to pass. There is much value to field lists if censored before publication by those who know the abilities of the observers—this sort of censorship is unfortunately seldom possible and less often practiced. The really unfortunate feature of the "Christmas Lists" is the element of competition which naturally creeps in. Even the most careful individual observer will, more or less unconsciously, give a record the benefit of a doubt if it adds one more species to his team score.

Such lists if confined to a limited area and repeated for a number of years with counts of individuals as well as species have a definite value but we have absolutely no sympathy with the so-called "century runs" extending from 3 A. M. to 10 P. M. and covering a hundred miles or more. They are purely endurance tests for the participants and the man who stays at home, if he knows the territory, can compile a list of species that the others will see that will be almost perfect.

Mr. Griscom has done a good service in publishing this paper and we hope that it may serve to emphasize the importance of accuracy and care in field identification. If he has made "ten-thousand mistakes" as he says [!? Ed.] how many are others likely to make? The reviewer has made many but, probably like Mr. Griscom, he fortunately did not publish them! If more care be not taken and more observations of rarities kept in the seclusion of note books the usefulness and charm of field lists will disappear. It is impossible to identify *every* bird that one sees. Other points that Mr. Griscom emphasizes and which should be carefully considered are the possibilities of other results from field observation besides the forming of big lists, and the impossibility and undesirability of publishing local lists for regions already well known. Our ornithological journals already have more really good papers and notes than they have space for and local lists of the sort mentioned are of no service except to gratify their compilers.

In regard to the abandonment of personal collections of skins in most of the well studied sections of the United States to which Mr. Griscom refers, and which is the natural result of accurate field identification and the desire for bird conservation, we have often wondered why the oölogists do not also "play the game," and give the birds a chance, especially the rarer species and those threatened with extermination! —W. S.

Peters and Loveridge on East African Birds.—This paper[1] is based upon a collection made by Mr. Loveridge in the interests of the Museum of Comparative Zoölogy in certain rain forest areas in Uganda and Kenya from November 1933 to June, 1934. A series of 530 skins representing 228 forms was secured, of which *Tyto capensis libratus* and *Zosterops silvanus* proved to be new and have been described (Proc. Biol. Soc. Washington, 48, p. 77). The narrative and general zoological results will be presented in a final report.

The arrangement of the annotations in the present report is under definite headings—Breeding, Synonymy, Diet, Measurements, etc., usually only one (rarely more than three) being given under a single species. One heading "parasites" contains mention of Mallophaga or other parasites which may be of interest to entomologists and which would be easily overlooked, buried as they are in the body of the text.

The proof-reading seems to have been hastily done as we notice several errors in spelling; the generic name *Argya* is consistently misspelled "*Argyra*" throughout the paper, and the heading for *Nectarinia formosa centralis* seems to have disappeared. There is a bibliography and several half-tone illustrations of nests and habitats.

The paper is a welcome contribution to the ornithology of east Africa and we shall look forward with interest to the final report on the region.—W. S.

Recent Papers on Guatemalan Birds.—Messrs. M. A. Carriker and R. M. de Schauensee have recently reported[2] upon two collections of birds from Guatemala, in the Academy of Natural Sciences of Philadelphia; one obtained by Samuel N. Rhoads and E. L. Poole during a trip to that country in 1915, and the other secured by the junior author in the highlands of the country in 1935. The former comprised 704 skins, the latter 408. From the former collection are described *Eumomota superciliosa sylvestris* (p. 418), *Geococcyx velox pallidus* (p. 426), *Ramphastos sulfuratus*

[1] Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. By James Lee Peters and Arthur Loveridge. Bull. Mus. Comp. Zool. LXXIX, No. 4, pp. 129–205. January, 1936.

[2] An Annotated List of Two Collections of Guatemalan Birds in the Academy of Natural Sciences of Philadelphia. By M. A. Carriker and Rodolphe Meyer de Schauensee. Proc Acad. Nat. Sci. Phila., LXXXVII, Pp. 411–455, December 27, 1935.

intermedius (p. 427); and from the latter, *Saucerottia beryllina motaguae* (p. 421) and *Mitrephanes phaeocercus pallidus* (p. 435). There are many discussions of the relationships of the species and other annotations of interest.

Another paper[1] dealing with the birds of this country is Ludlow Griscom's report on the Richardson collection in the British Museum from the Sierra de las Minas. One new form is described, *Chlorospingus ophthalmicus richardsoni* (p. 816), and annotations are given on thirty-nine forms of the higher altitudes with a zonal discussion of the mountain range.—W. S.

Danforth on West Indian Birds.—Dr. Danforth has recently published several papers[2] on West Indian birds occupying the entire October, 1935, number of the 'Puerto Rico Journal of Agriculture.'

First comes an annotated list of 67 species of birds observed in Cuba on a trip taken in 1933 followed by remarks on the advisability of introducing Cuban birds into Puerto Rico. The Wood Duck, Jacana, Mourning Dove, Barn Owl and Solitaire are among those whose introduction would seem to be of economic benefit. The introduction of ground nesting species is impossible on account of the mongoose.

Another paper is a supplement to the author's 'Birds of the Virgin Islands' with annotations on some seventy species. A complete list of the 132 species known from the islands follows.

An annotated list of the fifty-four species known from the island of Barbuda is also presented and there is a description of a new Ground Dove from St. Kitts, *Columbigallina passerina nigrirostris* (p. 483), and a race of the Broad-winged Hawk from Puerto Rico by Danforth and J. Adger Smyth—*Buteo platypterus brunnescens* (p. 485) —W. S.

Recent Papers by Berlioz.—In a short paper[3] on a collection of birds from the Belgian Congo, M. Berlioz presents notes on twenty-two species obtained by M. G. Babault mainly at M'Bwahi in the mountain forest west of Lake Kivu. Another collection obtained by Dr. R. Malbrant from the Chari River south of Lake Chad is also reported upon.[4] It comprised some seventy forms but none regarded as new.

In another paper[5] the author lists specimens of twenty-two species supposed to be extinct which are in the collection of the Paris Museum. We note that there are seven Passenger Pigeons, four Carolina Parrakeets, nine Esquimo Curlew and two Ivory-billed Woodpeckers, the last correctly regarded as possibly not yet exterminated, also a mounted specimen and three eggs of the Great Auk and a male Labrador Duck. Students of West Indian birds will be interested in two specimens of the Cuban Macaw (*Ara tricolor* Bechst.).—W. S.

Collinge on Food of the Coot.—It is gratifying to learn that Dr. Collinge is able to continue his studies of British economic ornithology. His recent paper on Food and feeding-habits of the Coot (*Fulica atra* Linn.)[6] is welcome not only as settling disputed features of this bird's activities in Great Britain but as suggesting parallel conclusions for the American Coot, not yet seriously studied. Coots consume much green vegetation and grind it finely so that analysis of their stomach contents is no

[1] The Birds of the Sierra de las Minas, Eastern Guatemala. By Ludlow Griscom, Ibis, October, 1935. Pp. 807–817.

[2] Journal of Agriculture of the University of Puerto Rico. XIX, No. 4, October, 1935.

[3] Étude d'une Collection d'Oiseaux du Congo Belge. Par J. Berlioz. Bull. Mus. Paris, VII, No. 3, 1935. Pp. 159–164.

[4] Étude d'une Collection d'Oiseaux du Tchad (A. E. F.) Par J. Berlioz. Bull. Mus. Paris, VI, No. 6, 1934. Pp. 490–496.

[5] Notice sur les Spécimens Naturalisés d'Oiseaux Éteints Existant dans les Collections du Muséum. Par J. Berlioz. Arch. du Mus. d'Hist. Nat. XII, 1935. Pp. 485–495.

[6] The Ibis, Jan. 1936, pp. 35–39, 1 table.

easy task. Dr. Collinge found such vegetation, chiefly grass and aquatic plants, to compose in averages of monthly diet 84.10 per cent of the contents of 157 stomachs. Food items next in rank were molluscs 4.60 percent, worms 3.23, and fish and fish eggs 2.39 percent. Charges that the Coot destroys numbers of the eggs and young of wild Ducks were little substantiated by this study, only two instances of bird-eating being found. The general conclusion is that the food habits are neutral and the bird essentially harmless.—W. L. M.

On the Types of J. K. Townsend's Birds.—In my review of Hellmayr's 'Birds of the Americas' (Auk, January, 1936, p. 104) I said "we do not think that the Washington and Cambridge specimens [of J. K. Townsend's birds] can be regarded as 'co-types.' Most of the new species were described in the 'Journal of the Academy of Natural Sciences of Philadelpha' and we maintain that the specimens retained there are the types."

When this was written I had intended publishing in the same issue a paper on the Townsend types with extracts from some letters of Audubon bearing upon the subject, to which reference was to be made. Unfortunately this paper had to be held over so that my statement lacked the explanation that it should have had. My point was not against the status of "co-types" as forming the basis of species described from several specimens but, rather, whether the specimens in Audubon's possession (which later came to the U. S. National Museum and the Museum of Comparative Zoölogy, were used in drawing up the descriptions which were published in the 'Journal' of the Philadelphia Academy, in Townsend's name, by an "ornithological committee" of that institution, during his continued absence in the West.

The "duplicate specimens" were sold to Audubon on October 23, 1935, and in all probability were at once taken possession of by him, at any rate he left Philadelphia on November 10, taking them with him to Charleston where he drew them. The paper describing the novelties was, according to Audubon, published by Dr. Samuel G. Morton, though some other members were doubtless associated with him on the "committee." As it was not read before the Academy until November 15, 1935, and as Audubon apparently had nothing to do with it, it seems very doubtful whether any of the specimens purchased by him were used in its preparation.

Furthermore Townsend's second collection was shipped in its entirety to Audubon in London and a part of it was purchased by him. How many additional specimens of the species he originally bought in Philadelphia were in this lot it is impossible to ascertain, but it is easily possible that some of those in Washington and Cambridge may have been secured at this later date. The whole matter is much involved but is interesting historically.—Witmer Stone, *Academy of Natural Sciences, Philadelphia.*

Other Ornithological Publications.

Andrews, C. L.—Migratory Birds of Northwestern Alaska. (Nature Magazine, February, 1936.)

Bailey, H. H.—A Revision of the Genus Coturnicops. (Bull. 10. Bailey Mus. and Library Nat. Hist., Miami, Fla.)—Describes *Coturnicops noveboracensis richi* (p. 1) from Canton, Ohio, and *C. n. emersoni* (p. 3) from Shandon, California. While the paper is dated September 1, 1935, our copy was not received until December 17. The delay in mailing this publication may result in some unfortunate duplication of names, as it has in the past!

Brand, Albert R.—Bird Voices in the Southland. (Natural History, February, 1936.)—Accounts of taking sound pictures of the Ivory-billed Woodpecker, Caracara, etc., etc.

Brassard, J. A.—Some Preliminary Notes on the Domestication and Rearing of the Willow Ptarmigan. (Le Naturaliste Canadien, November, 1935.) [In French.]

Canadian Christmas Bird Censuses.—(Canadian Field Naturalist, February, 1936.)

Cottam, Clarence.—Economic Ornithology and the Correlation of Laboratory and Field Methods. (Wild Life Research Leaflet, Biol. Survey. January, 13) Mimeographed—A valuable résumé.

Cottam, Clarence and F. M. Uhler.—The Rôle of Fish-eating Birds. (Progressive Fish Culturist, No. 14, U. S. Bureau of Fisheries. January, 1936.) Mimeographed.—Unrestrained fishing and pollution of waters, not birds, are the causes of fish scarcity. The latter have decreased just as have the fish and it is foolish, at the eleventh hour, to blame them for what they are not responsible for. The status of various birds cited as fish destroyers is considered in detail.

Csorgey, Titus.—Bird Conservation. Bird boxes, feeding shelves etc. as used in Budapest, Hungary, 1935. [In Hungarian.]

Dupuy, William Atherton.—Now the Nene. (Nature Magazine, January, 1936.)—Steps that are being taken to preserve the Hawaiian Goose which is threatened with extermination.

Eaton, Warren F.—Some Notes on the 1935 Season. (Nat. Asso. Audubon Socs., Circular No. 24.)—Dealing especially with the raptorial birds of the northeast.

Gladstone, Hugh S.—Obituary of Archibald Thorburn. (Scottish Naturalist, Jan.-Feb., 1936.)—With portrait.

Grinnell, Joseph.—Why we Need Wild Birds and Mammals. (Scientific Monthly, December, 1935.)

Gross, W. A. O.—Kent's Island—Outpost of Science. (Natural History, March, 1936.)—Account of the Bowdoin College Laboratory with sketches of the bird life of the island. A more detailed discussion of the Leach's Petrels was published in the October, 1935, issue of 'The Auk.'

Hicks, Lawrence E.—Distribution of the Breeding Birds of Ohio. (Ohio State University Studies, Vol. XI, No. 5, Nov. 10, 1935.)—This is a thoroughly up to date presentation of the subject. Following each species is a detailed account of its distribution with a numeral indicating the number of counties in which it has been found breeding. Fifty-nine species have been found to breed in all of the eighty-eight counties to date. There follows a comparison of the breeding birds of Ohio with those of adjacent states, and a bibliography.

Harrisson, T. H. and Buchan, N. S. Further Notes on a Field Study of the St. Kilda Wren (*Troglodytes t. hirtensis*) with especial Reference to its Nest Habits and Song. (Scottish Naturalist, Jan.-Feb., 1936.)

Jourdain, F. C. R.—Progress in Ornithology during the Past Half-Century. (Trans. S. E. Union of Scientific Societies, 1935.) [Of England.]

Kleiner, Andreas.—The Races of the Yellow Wagtail in Hungary. (Hungarian Ornith. Inst., Budapest, 1935.)—[In Hungarian with German abstract.]

Langelier, Gustave.—The Loons. (La Naturaliste Canadien, LXII, No. 11.)—A synopsis of the species with their ranges, etc. [In French.]

Lincoln, Frederick C.—The Migration of North American Birds. (Circular 363, U. S. Dept. Agric., October, 1935.)—An excellent résumé of the subject taking the place of Prof. Cooke's publication on the same subject which appeared in 1915. Contains much additional information drawn from the author's experience and the work of other students of migration.

Long, William H.—Autobiography of a Ring-necked Pheasant. (American Forests, January, 1936.)

Long, W. S.—Observations on the November Birds of Western Kansas. (Bull. Univ. of Kansas, XXXVI, No. 8, April 15, 1935.)—A well annotated list of sixty-nine species.

Lyon, William I.—Banding Migratory Birds. (Revista Rotaria, Enero, 1936.) [In Spanish.]

McAtee, W. L.—Food Habits of Common Hawks. (Circular No. 370, U. S. Dept. Agric. November, 1935.)—An excellent and convenient discussion of the Hawk question which should serve to combat the widespread prejudice against these birds, and to present the facts in the case.

Longstreet, R. J. and Others.—The Florida Audubon Society, Tortugas Expedition of 1935. (Florida Naturalist, January, 1936.)

Miller, Robert C.—A Spring Census of Lingnan Birds. (Lingnan [China] Science Journal, June, 1930.)

Miller, R. C.—Field Methods for the Study of Birds in South China. (Lingnan Science Journal, April, 1931.)

Mousley, Henry.—Is the Eastern Goldfinch Double-brooded? (Canadian Field Naturalist, December, 1935.)

Portielje, A. F. J.—A Remarkable Case of Polygamy in the Mute Swan. (Jour. fur Ornith. January, 1936.) [In German.]

Royal Ontario Museum Zoology.—Leaflet No. 4. The Starling in Ontario.

Rutledge, Archibald.—Birds and Serpents. (Nature Magazine, March, 1936.)

Selchow, Don H.—A Strange Partnership. (Natural History, December, 1935.)—Honey Guide and Honey Badger.

Slevin, Joseph R.—An Equatorial Wonderland. (Natural History, December, 1935.)—An account of the Galapagos and their fauna.

Veira, Carlos da Cunha.—The Cotingas of Brazil. (Revista Mus. Paulista, 1935.)—Descriptions of the species with synonymy, distribution and list of specimens the museum. [In Portuguese.]

The Ornithological Journals.

Bird-Lore. XXXVIII, No. 1. January–February, 1936.

A Marine Among the Birds. By James L. Denig.—Observations on the Midway Islands, with photographs of the Albatrosses and other birds by the author.

Modern Problems of Field Identification. By Ludlow Griscom.—(Reviewed on p. 238).

Bird Houses. By Roger T. Peterson.

Our Evening Grosbeak. By Lawrence H. Walkinshaw.

Bird-Lore's thirty-sixth Christmas Bird Census.—Cape May, N. J., leads the northeast with 111; Barnegat, N. J. 107; Bronx, N. Y. 106. A novelty in this report is a series of photographs of many of the observers.

The Condor. XXXVIII, No. 1. January–February, 1936.

Nesting of the Sierra Nevada Rosy Finch. By James B. Dixon.

Some Maritime Birds Observed off San Diego, California. By Loye Miller.

Some Notable Records of Birds for California. By Donald D. McLean.

Trapping Cedar Waxwings in the San Joaquin Valley, California. By Charles H. Feltes.—5982 trapped from February 14 to May 13, 1935!

The Family Relations of the Plain Titmouse. By John B. Price.

An Objective Method for Measuring Irritability in Birds. By S. F. Cook and Helen C. Fredrickson.—Based on the factor of light intensity.

Savannah Sparrow Migration Routes in the Northwest. By H. S. Swarth.

Further Studies Upon the Birds of the Pleistocene of Rancho La Brea. By Hildegarde Howard.—An annotated list of some thirty species.

The Wilson Bulletin. XLVII, No. 4. December, 1935.

Rim Rock and Solitaire. By P. B. Peabody.—On the Nesting of the Solitaire in Wyoming.

Beach-Combers. By Bayard H. Christy.—An attractive picture of migration on the shores of Lake Superior.

Storks in Trees. By Margaret Morse Nice.—An interesting account of bird life in rural Germany.

Wintering Warblers in Cameron County, Texas. During the Season of 1934–5. By L. Irby Davis.

An Example of Partial Albinism in the Eastern Crow. By Dayton Stoner.

The Sex Ratio in Ducks. By O. C. Furniss.—In fourteen species breeding at Prince Albert, Saskatchewan, April 29 to May 18, the counts showed 577 males to 365 females or a ratio of 1.6 to 1.

A Study of the Winter Bird Life in Bear Lake and Utah Lake Valleys. By C. Lynn Hayward.

The Cardinal now Twelve Years Old. By Albert F. Ganier.—Continuation of the history of a bird reported on in this journal in December, 1933 and 1934.

Arizona Fields are Virgin for Bird Banders. By Fred M. Dille.—Notes on various species at Phoenix.

The Oölogist. LII, Nos. 10, 11, 12, and LIII, Nos. 1, 2. October, 1935–February, 1936.

Afield in North Dakota. By F. B. Philipp. (October and November.)

Old Nesting Records of Rare Birds in Iowa. By P. A. DuMont. (January.)

The Stilt Sandpiper on its Nesting Grounds. By Frank L. Farley.—In Camrose, Alberta. (February issue.)

Fatalities. By Arthur Blocher.—A surprising list of dead birds etc. in roads in Illinois. (February.)

Bird-Banding. VII, No. 1. January, 1936.

The Function of Sexual Fighting in Birds: and the Problem of the Origin of "Territory." By N. Tinbergen.—An interesting discussion of the relation of sexual fighting to territory. It is claimed that territory as the function of fighting has been over emphasized: sexual fighting in animals other than birds often occurs without relation to territory.

A List of External Parasites from Birds of the Eastern Part of the United States. By Harold S. Peters.—Records of 198 species listed from 255 forms of birds.

An Analysis of Some Banding Records of the Eastern Red-wing. By Fred M. Packard.—Mortality of young; organization of midsummer flocks; instability of flocks; molt and migration; flight route are among the subjects discussed.

Recoveries of Banded Birds of Prey. By F. C. Lincoln.—A long list covering 26 species of Hawks and Owls.

The Cardinal. IV, No. 3. January, 1936.

The Canadian Component of West Virginia's Bird Life. By Maurice Brooks.—A list of 26 species; all of those recorded by Dr. W. C. Rives in 1898 are still to be found in spite of the sad destruction of the forest and a few others have been added.

City Pigeons. By Bayard H. Christy.—An account of the nesting of Domestic Pigeons on cliffs at Pittsburgh and comparison of the nesting in similar situations of wild birds on the coast of Ireland.

Some Personal Recollections of Oscar C. Reiter. By Edmund W. Arthur.—Former president of the Audubon Society of Western Pennsylvania.

The Nebraska Bird Review. IV, No. 1. January, 1936.

Our Bird Neighbors. By Solon R. Towne.

Many notes and lists of Nebraska birds.

The Murrelet. XVI, No. 3. September, 1935.

Birds of the San Juan Islands, Washington. By Robert C. Miller, E. D. Lumley and F. S. Hall.—An annotated list of 158 species and a hypothetical list of 29.

Introduced Food Plants for Waterfowl. By Theo. H. Scheffer.

Many notes on Washington birds.

The Migrant. VI, No. 4. December, 1935.

Nocturnal Migration in Stormy Weather. A symposium.

Bird Study at Peabody College. By Jesse M. Shaver.

Late Summer Nests and Nestlings. By Amelia R. Laskey.

Notes on Tennessee birds, a reproduction of bird photographs in miniature, and a photograph of the Tennessee Ornithological Society.

The Oriole. I, No. 1. January, 1936.

Some Observations on the Bird Life of Cumberland Island, Georgia. By Alexander Sprunt, Jr.

Ornithological Problems and Opportunities in Georgia. By Harry C. Oberholser.

The Gull. Vol. XVII, Nos. 10–12; Vol. XVIII, No. 1. Oct. 1935–January, 1936.

The Condor and Its Nesting Site. By Joseph J. Webb.—Personal observations. (October.)

Winter Food of Birds. By C. W. Lockerbie. (November.)

The Pacific Horned Owl. By Joseph J. Webb. (December.)

Christmas Bird Lists. (January.)

Many notes on Californian birds.

We have received the following mimeographed journals with much of local interest for the regions of which they treat. Bird students living near to the headquarters of the organizations publishing these journals would do well to affiliate themselves with them.

The Flicker. VII, No. 2–4. May–Dec. 1935. (Minnesota Bird Club, 4405, Lyndale Ave., S. Minneapolis, Minn.)

Inland Bird Banding News. VII, No. 4. December, 1935. (E. R. Ford, Chicago Acad. Sciences, Chicago, Ill.)

Jack-Pine Warbler. XIII, No. 4 and XIV, No. 1. Oct. 1935 and Jan. 1936. (Michigan Audubon Society, Miss M. E. Gross, Route 5, Grand Rapids, Mich.)

Long Island Bird Notes. II, Nos. 49–52; III, Nos. 1–10, Dec. 4, 1935 to March 4, 1936. (Woodmere Academy, Woodmere, N. Y.)

News Letter Audubon Society of Missouri. II, No. 7; III, Nos. 1 and 2 and Bulletin No. 1. Dec. 1935 to February, 1936. (S. L. O'Byrne, Rt. 5, Webster Grove, Mo.)

The Night Heron. III, No. 9 and IV, Nos. 10–12. (8 Fairoaks, St. Louis Co., Mo.)

The Prothonotary. I, Nos. 10 and II, Nos. 1 and 2. (Buffalo Ornithological Society, 378 Crescent Ave., Buffalo, N. Y.)

The Raven. VI, Nos. 11 and 12 and VII, No. 1. November, 1935 to January, 1936. (Rev. J. J. Murray, Lexington, Va.)

The Redstart. III, Nos. 1 to 5, October, 1935 to January, 1936. (Brooks Bird Club, Ogilbay Park, Wheeling, W. Va., J. W. Handlan.)

Saint Louis Bird Club Bulletin. IV, No. 8. November, 1935. (Elliot Ave., St. Louis, Mo.

The Ibis. (Ser. 13). VI, No. 1. January, 1936.

Birds of the Colony of Trinidad and Tobago. By Sir Charles Belcher. (Cont'd.)

The Food and Feeding Habits of the Coot. By W. E. Collinge.

Notes on Egyptian Birds, 1935. By F. C. R. Jourdain and H. Lynes.

The Birds of Northern Portuguese East Africa. By Jack Vincent. (Concluded.)

Field-observations on the Birds of the Lagoon-area between the Petite Camargue and the Spanish Frontire. By W. E. Glegg.

On a Collection of Birds from Northwestern Abyssinia. By R. E. Cheesman and W. L. Sclater. (Concluded.)

Bulletin of the British Ornithologists' Club. No. CCCXC. December 4, 1935.

P. R. Lowe exhibited hybrids between Pheasant and Black Cock and discussed them; there was also a discussion on the Gulls of the *argentatus* and *fuscus* group.

F. P. Bunyard described interesting experiments with Cuckoo's eggs. The eggs of Cuckoos permanently parasitic upon Reed Warblers become remarkably similar to those of the fosterer and it has been argued that this has come about by selection, but by substituting blown eggs of other Cuckoos which were quite different in appearance to those of the Reed Warblers it was found that the Warblers accepted them just as willingly. The speaker endorsed the suggestion of Dr. Rey that the similarity in color was brought about by similar food. The young Cuckoos fed by Reed Warblers continued to feed upon the same sort of food when they grew up and the food had the same effect upon the color of the eggs of both species (but see next issue, below!).

Stuart Baker described *Strix indranee shanensis* (p. 36) from the Shan States.

G. M. Mathews described *Pterodroma kidderi okahia* (p. 37) from New Zealand and C. M. N. White, *Monarcha chrysomela praerepta* (p. 38) from D'Enteecasteaux Islands.

Bulletin of the British Ornithologists' Club. CCCXCI. January 6, 1936.

G. M. Mathews in his chairman's address discussed the ossification of certain tendons on the patagial fan of Tubinares. The discussions on Gulls and on Cuckoos' eggs continued and Mr. Bunyard's conclusions are refuted.

There is a review of the Crested Larks by C. G. Bird.

Emberiza schoeniclus mackenziei (p. 54) and *Anthus spinoletta meinertzhageni* (p. 55) are described by E. G. Bird, from the Outer Hebrides, and *Pterodroma neglecta juana* (p. 59) by Mathews from the Juan Fernandez Group.

Bulletin of the British Ornithologists' Club. CCCXCII. January 31, 1936.

Dr. P. H. Manson-Bahr exhibited paintings of Birds of Paradise and discussed at length their display and the use of the wonderful plumes of the males. He concludes that the display is "a sexual act performed for the benefit of the soberly clad female." The birds in the Zoo performed best in the early morning when not disturbed by visitors.

N. B. Kinnear described *Sitta castanea tonkinensis* (p. 71) from Tonkin and Laos, Indo-China, and C. W. Benson, *Calamonastes simplex neglectus* (p. 71) from Nyassaland.

British Birds. XXIX, No. 7. December 2, 1935.

A Chart of Bird Song. By H. G. Alexander.—Showing the song period for British Birds.

Sykes's Wagtail as a British Breeding Bird. By E. C. Arnold.

Some Remarks on the Patagial Fan of the Three British Breeding Petrels. By G. M. Mathews.

A Contribution to the Study of Sea-Bird Movements. By P. H. Trahair Hartley. —The marked movements off the coast of Cornwall during spring and late summer may be true migration or daily feeding movements; the author inclines to the latter.

British Birds. XXIX, No. 8. January, 1936.

Skokholm Bird Observatory. By R. M. Lockley.—An island in Pembrokeshire where from 750 to 1000 birds are trapped yearly.

Notes on Fulmar Petrel Colonies in Northumberland, 1935. By M. J. Levett.

British Birds. XXIX, No. 9. February, 1936.

The Distribution and Numbers of Breeding Gannetts. By V. C. Wynne Edwards and R. M. Lockley.—9200 in British Isles and Iceland and 10,000 in Canada.

The Avicultural Magazine. (IV series.) XIII, No. 12. December, 1935.

A Collector on Melville Island. By Walter Goodfellow.—In Timor Sea, N. W., Australia.

An Amateur Bird Photographer meets a Hummingbird Family. By Carl Naether. —In California, but no attempt seems to have been made to identify the species.

The Avicultural Magazine. (V series.) I, Nos. 1 and 2. January–February, 1936.

With the beginning of a new series the magazine assumes a new cover almost the same color as 'The Auk' but with the Egret as its patron saint!

A Colored plate of *Malaconotus cruentus gabonensis* (Jan.) and *Poephila leucotis* (Feb.)

Breeding Notes etc. from Cleres. By J. Delacour. (Jan.)

Collecting Waterfowl in Madagascar. By C. S. Webb. (Feb.)

A West Indian Diary. By Sydney Porter. (Feb.)

The Oologists' Record. XV, No. 4. December, 1935.

The Jay as a Migrant. By F. C. R. Jourdain.—Birds possibly from France arrived in large numbers in England.

In Kenya Highlands. By C. F. B.

A Few Notes taken at Tromsö. By B. Guy Harrison.

Bird Notes and News. XVI, No. 8. Winter, 1935.

Clutches and Clutchers.—A strong protest against illegal egg collectors; "local ornithological societies could do much by refusing to admit them as members"!

Birds of Newfoundland. By A. M. Jacob.

The Emu. XXXV, Part 3. January, 1936.

Bristle-birds of Western Australia. By H. M. Whittell.—With colored plate.

Nesting of the Emu. By David Fleay.—With photographs.

Notes on Swifts. By E. A. R. Lord.

The Excursion to Marlo. By C. E. Bryant.—With many excellent photographs.

The Food of Australian Birds. By A. H. Lea and J. T. Gray.

Many short notes on Australian birds.

The South Australian Ornithologist. XIII, Part 4. October, 1935.

Notes and short articles on the birds of South Australia.

L'Oiseau. VI, No. 1. 1936. [In French.]

A Revision of the Genus Mixornis Blyth 1842. By J. Delacour.—Fifteen races of *M. gularis* and four of *M. flavicollis* are recognized, none described as new.

A Critical Study of the Capitonidae of the Oriental Region. By J. Berlioz.—No new forms described.

A Consideration of the Avifauna of the Isle of Noirmoutier. By N. Mayaud.

The Enigma of the Cuckoo. By F. Cathelin.

Notes on Some Weavers of Northern Rhodesia. By J. M. Winterbottom.

The Ornithology of Lower Brittany. By E. Lebeurer and J. Rapine. (Cont'd.)

Variation in Plumage and form in Birds. By M. Legendre. (Cont'd.)

Notes on the Avifauna of the Balearic and Pityusae Islands. By E. L. Bernath.

On the Denudation of the Face in the Rook. By A. Chappellier.

On Some Notes from the Camargue. By G. R. Mountfort.

Journal für Ornithologie 84, Heft 1. January, 1936. [In German.]

King Ferdinand of Bulgaria at Seventy-five with portrait.

Nests and Eggs from Damaraland. By W. Hoesch.

A Contribution to the Biology of Papuan Birds. By G. H. W. Stein.

The Birds of Northern Baikal. By B. Stegmann.—An annotated list of 191 species.

A Remarkable Case of Polygamy in the Mute Swan with a Contribution to the Etology and Psychology of *Cygnus olor*. By A. J. F. Portielje.

An Experience with the Lammergeier in Bosnia and Herzegovina. By Otmar Reiser.

Ornithologische Monatsberichte. 43 Jahrgang, No. 6. November–December, 1935. [In German.]

On Our Knowledge of the Food Habits of the Ural Owl. By H. Schafer and Graf Finckenstein.

Rhipidura brachyrhyncha and *R. devisi*. By K. Paludan.—Relationship and synonyms.

In "Short Notes" Laubmann records *Accipiter pectoralis* as a new bird for Paraguay.

Ornithologische Monatsberichte. 44 Jahrgang, No. 1. January–February, 1936. [In German.]

On the Breeding Biology of the Cuckoo. By Hans Finckenstein.

The Anatomy of the Kingfisher's Foot. By George Steinbacher.

Birds and Salt Water. A Contribution to the Question of Water Economy of Birds. By Hans Schildmacher.

On *Egretta gularis* and Related Forms in Africa. By F. Steinbacher.

In "Short Notes" W. Meise describes *Prinia mystacea mutatrix* (p. 23) Lake Nyassa; and J. Delacour, *Alcippe nipalensis grotei* (p. 24) new name for *A. n. major*. Several forms new to Java are listed by A. Hoogerwerf.

Der Vogelzug. VII, No. 1. January, 1926. [In German.]

The Early Summer Flight of the Starlings from the Windenburg Area. By Heirich Krätzig.

On the Year's Distribution of the Buzzard (*Buteo b. buteo*). By F. Burr.

Fourteenth Annual Report of Bird Watching at Rossiten. By R. Drost.

Beiträge zur Fortpflanzungsbiologie der Vögel. Jahrgang 12, No. 1. January, 1936. [In German.]

A Contribution to the Biology of the German Eagle Owl. By O. Schurre.

On Deterioration of Song in City Birds. By H. Frieling.

On the Nesting-wisdom of the Titmice. By R. Berndt.

Der Ornithologische Beobachter. Jahrgang 33, Hefts 3 and 4. December, 1935 and January, 1936. [In German.]

The Dotterell in the Bern Highlands. By E. Haueter.—With excellent photographs. (December.)

A Glance at the Composition of the Swiss Bird Fauna. By W. Bieri and G. Blatti. (January.)

Ardea. XXIV, Afl. 3–4. December, 1935.

Has the Bird a Sense of Locality? By Erwin Stresemann.—An interesting discussion of the "homing instinct." [In German.]

Results of an Investigation of the Home-finding Ability of the Starling. By H. N. Kluijver. [In German.]

Studies of *Larus argentatus* and *L. marinus*. By G. J. Broekhuysen. [In Dutch.]

Organ of the Netherlands Ornithological Club. VIII, No. 2. December, 1935.

Breeding Birds of the Wieringer Marshes in 1935. By J. R. H. Schaank.

Nesting of Hemiprocnitidae and Podargidae in Western Borneo. By L. C. de Ruiter.—With a very interesting photograph of the young of *Hemiprocne longipennis harterti*.

Geographic Distribution of the Pycnonotidae in the Indian Archipelago. By Baron Snouckaert van Schauburg.

Ornis Fennica. XII, No. 3. September, 1935. [In Finnish.]

On the Food Biology of *Accipiter n. nisus* During Migration. By Sven Norberg.—Of interest in connection with its relative, our Sharp-shinned Hawk. [In German.]

A Specimen of *Phalacrocorax perspicillatus* Pallas. in the Collection of the Zoölogical Museum in Helsingfors. By Pontus Palmgren.—An extremely interesting discovery of a specimen of the extinct Pallas's Cormorant, a bird twice the size of our Double-crested species. Only four specimens were known when Dr. Stejneger wrote of the species in 1889.

Ornis Fennica. XII, No. 4. December, 1935. [In Finnish.]

On the Daily Rhythm of Birds in the Arctic Summer. By Pontus Palmgren. [In German.]

Many local notes and short papers on birds of Finland in both issues.

Danske-Fugle. XVI, Bind 4. 1935. [In Danish.]

A well illustrated article on *Motacilla melanope;* and a record of banded birds and returns.

Ceskloveńsky Ornitholog. 1936, Cislo 1. [Wholly in Hungarian.]

Many short articles on Hungarian birds.

Hornero. VI, No. 1. August, 1935. [In Spanish.]

Argentine Ducks. By J. Casares.

Observations on Some Birds of Tierra del Fuego and the Isla de los Estados. By A. Castellanos.

Zenaida auriculata in the Northeast of Brazil. By Rudolfo von Ihring.—Describing the enormous trade in these Doves and their eggs; illustrated.

Synopsis of the Argentine Ciconiiformes. By A. R. Zotta and S. de Fonseca.

Are the Parrots Deserving of National Protection? By R. Dabbene.

On the Nesting of the Egrets. By J. B. Daguerre.

The Urutau (*Nyctibius griseus cornutus*) in Captivity. By Pedro Serie.

Grasshopper-eating Birds in Argentina. By J. Liebermann.—Several Hawks, a Heron and a Tinamou.

There are a large number of short notes on Argentine birds and the first installment of a systematic list of the birds of the country.

CORRESPONDENCE.

Injury Feigning in Birds.

Editor of 'The Auk':

It is a weakness of many ornithologists who discuss bird behavior that they restrict themselves to the near-at-hand. Parochialism in field-study—concentration on a particular area or particular species—has a special value, but parochialism in reading is another matter; it is sometimes tantamount to laziness. How much better informed we would be if, on the one hand, Australian students kept more closely in touch with 'The Auk' and 'The Ibis,' and if, on the other hand, English and American ornithologists paid more attention to 'The Emu' and other vehicles of observations on Australian birds. For my own part, prior to writing on subjects of a general nature, either in 'The Auk' or 'The Ibis' or in my own books, I have consulted all available literature, and the results invariably have been useful. Similarly, I suggest that no British writer on an "extra-limital" subject, such as parasitism, or vocal mimicry, or, for a more topical example, injury-feigning in nesting birds, can afford to overlook what has been published by Australian students.

I am moved to make these comments through reading a letter in 'The Auk' for July of 1935. Discussing birds that feign injury, Harry S. Swarth says he has never seen a Passerine bird do so, nor has he ever read of any bird other than Plovers and Doves following the practice. Mr. Swarth has been unkind to himself in this matter. By merely glancing through a few British books he would have found references to injury-feigning among certain other species, and by looking through Australian publications (notably 'The Emu') he would have found many records of Passerine birds resorting to the device. Moreover, he would have learned that in Australia the trick is not confined to birds which nest on the ground, as John Burroughs declared long ago was the case in America and as Julian Huxley declared recently was the case in Europe. Here, then, is an instance of negative evidence in one land being destroyed by positive evidence elsewhere.

Australian birds that feign to be injured include tree-nesting Pigeons of several species, certain Plovers, certain Ducks, and (among Passerine birds) certain Robins, Whistlers, Wrens, Quail-Thrushes, Chats, and some few other small birds. It is to be noted—and this answers another of Swarth's queries—that injury-feigning is not constant throughout a family, nor, as far as I know, throughout a genus. Nor does it appear to be constant throughout a species. In a long experience with certain tree-nesting birds I have known injury-feigning to be practiced by them only on rare occasions, and a colleague has told me that after about thirty years' experience with the ground-nesting Pilot-bird, he recently, for the first time, saw one resort to the "broken-wing trick." What this apparent inconsistency in a species implies I cannot at present conjecture.

Regarding the question of cause and effect, it may be recalled that an English writer stated some years ago that it is not correct to speak of such a procedure as feigning injury. "The bird," he claimed, "is deliriously excited and has a fit." Supporting this view, W. H. Hudson wrote that when a nesting bird flutters to the ground it does so from pain and is for the moment incapable of flight. "Its efforts to recover flight and safety," he added, "cause it to beat its wings, and tremble, and gasp with open mouth." I suspect this belief to be based on scanty observation. There need be no doubt that the bird is excited, but to describe its actions as a "fit" is unsound. If it were incapable of flight it would scramble about in the one spot.

As a fact, it watches the intruder carefully while fluttering away from the nest, and if he does not follow it will fly back towards him and repeat the performance. It has no need to make "efforts" to recover flight, for it can do so at any moment. Anyone who thinks that, in such circumstances, a bird is really unable to fly should try to catch one of the little actors—and watch it flit to a safe place as soon as it has lured him from the nest.

Dr. Herbert Friedmann is quoted as saying that injury-feigning is a compromise between fear and the reproductive emotions. "Fear impels the bird to leave its nest; the bond to the nest and eggs or young prevents the bird from doing so; the result is a crippled departure." This conclusion seems perilously akin to the "incapable of flight" theory. It is difficult, in my experience, to distinguish between fear and discretion in respect of a bird leaving its nest; but even if we agree that the bird is afraid we need not necessarily agree with the remainder of Friedmann's theory. That is to say, we may fairly reject the implication that the bird, being torn between conflicting emotions, cannot help itself and thus staggers away. I am thoroughly convinced, after seeing scores of exhibitions on the part of numerous species of Australian birds, that such a belief is fallacious. It follows that I regard Friedmann's use of the term "crippled departure" as somewhat misleading. The bird is not crippled and is not departing; it is merely tumbling about the vicinity of the nest in an effort to deceive the intruder; and, as Swarth has pointed out, it sometimes returns from a distance in order to do so.

Another effective point in Swarth's letter is that when a Semipalmated Plover pretended injury, not only her mate but neighbouring pairs joined in the demonstration. In Australia this joining of forces has frequently been observed among certain Chats and Honeyeaters; when a pair of nesting birds flutter along the ground and utter distressful cries they are sometimes reinforced by other birds of the same species (which may or may not be nesting), and the whole company feigns injury. Are we to regard the coöperation of the other birds as "sympathy fits"?

On the whole, I think injury-feigning birds are animated by some emotion other than plain fear. Perhaps we may regard it as parental solicitude in nest-owners and social solicitude on the part of outsiders that join in the demonstrations. Moreover, I have no doubt that the performers appreciate what they are doing, if only on a basis of instinct. Their actions are just as resolute as those of birds which attempt to defend their homes by force, and just as intelligent as those of birds which, in time of supposed danger, carry their babies away on their backs, beneath the wings, or in the claws.

Apropos, it may be noted that Julian Huxley (in Bird Watching and Bird Behaviour), after tacitly rejecting the "fit" theory by noting that the performers "spring into the air when the enemy has been lured far enough from the nest," sums up in this way: "All the evidence is against the bird having any conscious purpose or knowledge of what it is doing; the shamming wounded is an inborn pattern of behaviour, like sneezing in ourselves." As to this, I suggest that, since Professor Huxley restricts the practice to ground-nesting birds, he did not weigh all the evidence, and, further, I suggest that it is not yet proved that the injury-feigning bird lacks conscious purpose. At any rate, it seems to me that the bird possesses at least instinctive knowledge of the situation, and that its actions thereby become instinctively purposeful.

How did the practice arise? Huxley's reference to "an inborn pattern of behaviour" is comfortable, but it does not take us far. An earlier British writer on bird behavior (Frank Finn), has suggested that the "drooping of the wings under

social excitement is no doubt the origin of the 'shamming lame' behavior common to so many birds when beguiling enemies away from their nests and young, as in the cases of the Partridge, Lapwing, and Sheldrake; though no doubt the habit, emotional at first, becomes afterwards an intelligent action, in some cases at all events." This suggestion is interesting. Personally, however, I think it more probable that the practice developed from encounters with reptiles or small mammals, and may have had its origin in genuine cases of semi-paralysis. I do not think it likely that the trickery was devised for the confusion of man, even though it is practiced largely upon him. It may, indeed, have been in vogue long before man came upon the earth.

Yours, etc.,
A. H. Chisholm
(Corr. Fellow A. O. U.)

"The Argus,"
Melbourne,
Australia.

Editor of 'The Auk':

In the late Mr. Swarth's letter on "Injury-feigning in Nesting Birds," in 'The Auk' of July 1935, he wrote that he could not recall the instance of a Passerine bird resorting to injury-feigning at the nest.

As, according to my recollections of British birds, the Meadow Pipit (*Anthus pratensis*) was a very decided instance of a Passerine bird so acting, I wrote to a friend of mine in England (Mr. J. Steele Elliott of Bewdley) for confirmation. Besides confirming my impression he adds "a far better example is the Reed Bunting (*Emberizia schoeniclus*)." In British Columbia I have had one experience of this kind an Oregan Towhee which was frightened from her nest and young on May 29, 1919, by my walking up to it. She feigned injury but the performance was not very pronounced.

Yours sincerely,
Theed Pearse.

Courtenay, Victoria Island,
British Columbia.
March 6, 1936.

Birds Pairing with Mounted Specimens.

Editor of 'The Auk':

I was interested to read Messrs. Noble and Vogt's article on birds copulating with mounted specimens for over thirty years ago my mention of the fact in the press was ridiculed as a "traveller's yarn."

I mentioned then that when shooting Wood Pigeons (*Columba palumbus palumbus*) and Curlews (*Numenius arquata arquata*) over stuffed decoys, mounted on stands, both species repeatedly copulated with them not merely in isolated cases but often.

H. W. Robinson.

Lancaster, England.

Bat Banding—A Request for Cöoperation.

Editor of 'The Auk':

The example set by bird banding has led mammalogists to try various methods of marking bats to study their movements and migrations. Over 7000 bats have been banded to date by various workers in the United States and Germany; and many interesting returns have been recorded (Eisentraut, M, Zeitschrift für Morphologie

und Ökologie der Tiere, 28 Band, 5 Heft and Ornithologische Monatsberichte, 43, 1 and 43, 5. Mohr, C. E. Proc. Pennsylvania Acad. of Sciences, vol. 8, pp. 26–30. Griffin, D. R. Journal of Mammalogy, vol. 15, no. 3). However, the lack of popular interest in bats has made it very difficult to secure returns.

Field ornithologists could render extremely valuable coöperation if they would watch for banded bats whenever they have an opportunity. Most of the bats carry regular aluminum bird bands around their hind legs. Whenever a bat is captured or found dead, it is well worth while to examine it to see if it is banded. Full data on any recoveries of banded bats should be sent to the U. S. Biological Survey, Washington, D. C., or to the writer.

Most of the American bat banding work has been done in the Northeastern states, particularly Pennsylvania, Massachusetts and Vermont. Consequently this request for coöperation is directed especially to ornithologists in this district.

It seems very desirable to locate all the large bat colonies in the New England region, in order that the bat banding studies may be as complete as possible. If any of the readers of 'The Auk' know of caves where bats might hibernate in winter, or large summer colonies in buildings, they are urged to communicate with the writer.

DONALD R. GRIFFIN.

Barnstable, Mass.

OBITUARIES.

Warren Francis Eaton, an Associate of the American Ornithologists' Union since 1921, died at Mountainside Hospital, Montclair, New Jersey, February 16, 1936, in his thirty-sixth year. He had been in robust health until two weeks before his death when he suffered an attack of appendicitis. Complications followed which proved fatal. His passing from the ranks of those fighting to preserve American bird life, and especially those striving to prevent the extermination of our native Hawks and Owls, is a cruel blow to the cause to which he had but recently dedicated his entire time and effort.

Born in Weston, Massachusetts, on July 8, 1900, Mr. Eaton found in the natural environs of his home much to develop and hold his interest. An inborn love of nature, manifest at an early age, was recognized and encouraged by his parents, Mr. and Mrs. Charles Eaton. From the first he found keen delight in the study of birds and his pursuit of the hobby of field identification and the recording of his observations held through his school and college years and his later business life. While at Harvard he was active afield, his interest extending to all forms of outdoor sports. He developed no mean ability as an athlete but his love for natural science transcended all his other interests and much of his spare time was spent in a study of New England bird life, particularly birds seen from the trails of the Green Mountains. He joined the Nuttall Ornithological Club, serving eventually as its Secretary, and through this association he felt the stimulating contact with a group of prominent naturalists, thus adding anew to his enthusiasm.

After graduating from Harvard in 1922, he took a position with Wellington, Sears and Company, cotton goods factors, being located, first at Boston but transferring a year later to New York. He joined the Linnaean Society of New York in 1924 where his enthusiasm, his abilities and his willingness to work in the interest of ornithology were promptly appreciated. He served for several years on the Council of the Society, also consecutively as its Secretary, Vice-President and President and up to the time of his death he was one of its most active field workers, adding substantially to the known facts of bird occurrence and bird distribution in the New York City region.

While circumstances had always limited the field of his activities Mr. Eaton had the instinct of an explorer. He had lived in New York City only a short time before he had visited all the well or little known "birding spots," nooks and corners within its borders. He was a born geographer and statistician of bird life. One of his early efforts in New York was the compilation of a list of birds recorded from Manhattan Island. A few years later a short vacation spent in Bermuda started him on the task of compiling a list of birds recorded from that island, his up to date compilation finally being included in the bulletin entitled 'Bermuda Birds,' by Reid and Bradlee, published by the Boston Society of Natural History.

In 1927 he married Miss Kethryn Vesey and eight years ago they moved to Upper Montclair, New Jersey, where he applied himself with great diligence to a study of bird distribution in northeastern New Jersey. He was a wide and rapid reader and a careful searcher of the literature of the past. His latest work 'A List of the Birds of Essex County and of Hudson County, New Jersey, with Especial Reference to City Growth and Bird Population,' now being published by the Linnaean Society of New York, shows the thoroughness and intensity of his efforts to assemble all the known data. He had more recently started a similar survey of the bird life of Passaic County.

Mr. Eaton had an especial passion for the birds of prey and his concern over their future led him to organize a few years ago the Hawk and Owl Society. In 1936 he was appointed to the staff of the National Association of Audubon Societies, taking over the Hawk and Owl protection work of that organization. In his new position his remarkable capacity for sustained and effective effort in behalf of conservation, and his natural and becoming aggresiveness were soon emphasized and were winning for him a national reputation. His services for the cause of bird protection were conspicuously outstanding, for he was a doer of deeds rather than a philosopher.

Mr. Eaton last year organized the New Jersey Ornithological Society. He was President of the Montclair Bird Club; also a member of the New Jersey Field Ornithologists' Club, the Green Mountain Club and various other societies of naturalists. He was identified with the Unitarian Church of Weston, Mass.

His widow, a daughter, Carol, and his parents survive him.—C. A. U.

George Melendez Wright, elected a Life Associate of the American Ornithologists' Union in 1927, died as a result of an automobile accident near Deming, N. M., February 25, 1936. The International Wild Life Refuge Commission of which he was a member was traveling from El Paso, Texas to Tucson, Arizona and Wright and Roger Toll, Superintendent of Yellowstone National Park, were riding in the first of two automobiles. As a Connecticut car going in the opposite direction appeared in sight, a tire blowout threw it in the path of the Commission car, causing the death of Toll, Wright and one of the occupants of the Connecticut machine.

George Wright was born in San Francisco, California, June 20, 1904, a son of John Tennant and Mercedes Melendez Wright. He received his early education in the public and high schools of San Francisco and in 1927 graduated from the University of California in the College of Forestry.

From an early age he had shown a deep interest in natural history, particularly in birds, and soon after graduation was appointed a ranger in Yosemite National Park. Later he became junior park naturalist contributing a great deal to the naturalist program. Possessed of ample means and finding the facilities inadequate for the work in hand, he organized, at his own expense, the first wild life survey of the National Parks and carried it on during the next three years. In 1934 he was appointed Chief of the Wild life Division of the National Park Service and succeeded in bringing that branch of the work to a high degree of efficiency. Recently he took an active part in the preparations for the North American Wild-life Conference and contributed to the program.

In spite of the fact that Wright had not attained the age of 32, his contributions to ornithology are important. In 1926, with Joseph S. Dixon, he made a trip to the Mount McKinley region in Alaska, where on May 28 of that year, he discovered the long sought nest and eggs of the Surf Bird (Condor, 1927, p. 9). While stationed in Yosemite and while working in other National Parks as well as during a visit to Puerto Rico and the Virgin Islands, he enjoyed unusual opportunities which he utilized to the utmost for studying the habits of the various species which came under his observation. His publications on birds appeared chiefly in 'The Condor,' 'The Gull,' 'Yosemite Nature Notes' and the 'Fauna Series' of the National Park Service. With Joseph S. Dixon and Benjamin H. Thompson he published in 1932 'A Preliminary Survey of Faunal Relations in National Parks' and recently in coöperation with Thompson, 'Wild Life Management in the National Parks.'

George Wright was a man of unusual attainments and had before him the prospect of a brilliant career. His energy, enthusiasm and broad vision were tempered with patience and a keen perception of the practical side of the problem in hand. His

knowledge of the habits of birds and mammals gained during active work in the field was unusually detailed and accurate. He had a deep appreciation of the importance of conservation and a faculty for devising practical methods of work. His premature death is an irreparable loss to ornithology and conservation.—T. S. P.

Walter Burgess Savary. On January 7, 1936, there passed away one of the most remarkable men I have ever known, Walter Burgess Savary, of Wareham, Massachusetts, an Associate Member of the American Ornithologists' Union. He was born in New York City, the son of Adolphus and Adeline (Burgess) Savary, on January 28, 1855. His father was a civil engineer, which caused many changes in residence; the family moved to Wareham in 1855, and afterwards lived at times in Boston, Lowell, Plymouth and New Bedford in Massachusetts, and in Concord and Laconia in New Hampshire. He was educated, as a child, in a tiny country school in Wareham, which he attended for only eight years, or until he was between fourteen and sixteen years old. The remarkable fund of general knowledge that he acquired in later years was gained by self-education and exhaustive reading, assisted by an unusually retentive memory. As a youth, he assisted his father in surveying and laying out the railroad when it first reached Provincetown on Cape Cod. In 1878, he went with his father and his brother, Philip, to Norfolk, Va., in a sail boat; on that trip he visited Washington, and says of the Smithsonian Institution, in his diary, that the collections of birds and eggs did not come up to his expectations, though he was impressed with the Indian implements. He was married in 1884 to Ellen Frances Bourne, and shortly after that went to Tacoma, Washington, where he engaged in business for several years, maintaining a shop for repairing bicycles. In 1897, his wife died and he returned to Wareham, where he built up a successful shellfish business, sold sand and did some business in truck gardening.

When a mere lad of fourteen years, he began collecting birds' eggs, but it was not until the latter part of his life that he found time to travel extensively and build up a really fine, scientific collection of eggs. He visited at my home occasionally to see my collection, and was always glad to accept such damaged and badly broken eggs as I had discarded, as hopeless, which he repaired, or pieced together with plaster of Paris, with such consummate skill that they made very presentable specimens.

About 1914, he built with his own hands a sail boat 36 feet long and began taking trips up and down the coast as far south as Virginia; it was then that he began in earnest to build up his collection of birds' eggs. In the fall of 1920, he rode up to my house on a new motorcycle, which he had just bought, and started on it the next day for California; there he spent the winter and spring with his brother, Philip, and collected extensively. His shellfish business occupied his time in the summer and early fall, leaving him free to travel during the winter and spring. He discarded the motorcycle for an automobile, which he fitted up so that he could sleep in it and carry his outfit, and with this he made some long collecting trips. He drove to Jacksonville in the fall of 1925, bought a small boat, about twelve feet long, and fitted it with a sail and a tent for shelter; in this he cruised around the peninsula of Florida, camping on shore, sleeping on the boat, and collecting.

In December, 1926, he motored to Virginia, Tennessee, Alabama, Arkansas, Oklahoma, and Texas, as far south as Brownsville, spending the winter and spring in Texas, where he made extensive collections and celebrated his 72d birthday. Other collecting trips took him to the Carolinas, Georgia and the interior of Florida.

During the winter of 1929 and 1930, when he was 75 years old, he built with his own hands, an addition to his house about 40 feet long, which he fitted up as a

museum to hold his treasures. The walls are decorated with his own water color paintings, photographs, snakes' skins and other curios, and lined with cabinets, book-cases, tables and work benches. The museum is full of interesting things, illustrating his zeal and energy as a collector and his skill as an artisan. Conspicuous among these is a large globe, some 30 inches in diameter, in the making of which he used several thousand pieces of wood, glued together, covered with gauze and smoothly coated with plaster; on the surface of it is accurately drawn and colored a map of the world, showing all the details down to the principal cities; it revolves in two directions with perfect alignment of longitude and latitude. There are models of a full-rigged ship, a schooner 5½ feet long, a sloop six feet overall and canoes, all perfect in detail. His egg collection consists of over 2300 sets, including a collection of Hummingbirds' and other nests mounted on stands.

There is a large collection of shells, Indian implements and arrowheads, old coins and many curios, relics and souvenirs of historic interest. His collection of butterflies and moths is not large, but he made a fine collection of water color drawings of these insects, showing excellent technique and accuracy in detail even in the smallest species, all of which were neatly bound by him in a single volume. He also showed his skill as a bookbinder by binding a complete file of 'Forest and Stream,' from 1874 to 1929 inclusive; the art of bookbinding he had taught himself. During his last years he amused himself by writing a fanciful story, entitled "Voyages to Other Worlds," in which he showed an ingenious imagination; the first volume contains over 400 pages, with every letter printed by hand and illustrated with his own colored drawings of imaginary animals, plants and scenery; for a man nearly 80 years old, the finely drawn details in these pictures show marvellous execution.

From the foregoing it will be seen that Walter B. Savary was a remarkable example of a self-made man; with only a brief schooling and always with limited means, he accomplished much and made himself proficient in many lines. He often visited at my home and the members of my family all agreed that he was one of the most interesting guests that we ever entertained, for he could talk most fluently and entertainingly on a wide range of subjects, due to his thirst for general knowledge and his retentive memory. He enjoyed vigorous health nearly up to the end, coupled with untiring energy; he climbed to Eagles' nests in Florida when he was past 70, and his strong hands were steady as a rock, yet equal to the most delicate work to the very last.

Only two of his four children are living, Warren H. Savary, at whose home he died in North Plainfield, N. J., and Mrs. Edith S. Hall, of East Wareham, Massachusetts, to whom I am indebted for much of the above information.—A. C. Bent.

NOTES AND NEWS.

THE WILD LIFE CONFERENCE in Washington, D. C., February 3 to 7, 1936, called by President Roosevelt, was a great success and has done more perhaps than any one effort to arouse the interest of the people of the United States in the preservation of their wild life and protecting it from influences tending to its destruction.

What is needed now and what it is to be hoped will be accomplished is the organization of all of those interested in wild-life so that they shall be prepared to send delegates to Congress to protest every piece of legislation detrimental to wild life. For years the sportsmen have been thoroughly organized to further the preservation of wild fowl to the end that they will have game to shoot; the lumber interests have power organizations to ensure forests for cutting for lumber and the grazing interests have lobbies for defeating any legislation detrimental to their privileges. Wild life lovers however were represented, if at all, by a handful of scattered individuals with no organization behind them and necessarily made little showing against interests that were fully organized.

We should now have in every community organizations of those interested in conservation with no personal, political or financial axe to grind and whose whole object is to save our wild life.

THE BIOLOGICAL SURVEY began, in September, the publication of the 'Wild Life Review' conducted by W. L. McAtee to provide abstracts of articles on wild life management for the benefit of the employes and coöperators of the Survey.

ANOTHER new publication is 'The Oriole' a quarterly devoted to the ornithology of Georgia and sponsored by the Atlanta Bird Club. Don Eyles and Norman H. Giles, Jr. are the editors. We welcome this newcomer among the bird journals; we cannot have too many of these local magazines especially in the South.

WE HAVE been informed by Director Arno B. Cammerer, of the National Park Service, that orders have been issued by the Jacksonville Division of the United States Coast Guard carrying instructions for the coöperative patrol of the Dry Tortugas Keys bird reservation.

Although no funds are available this year for providing a custodian of the Fort Jefferson National Monument, Mr. Herbert Kahler, Superintendant of the Forts Marion and Matanzas National Monuments, St. Augustine, Florida, has been placed in charge and with the coöperation just mentioned the National Park Service hopes and expects to give adequate protection to the remarkable bird life of the region.

THE CANADIAN authorities have called attention to the growing numbers of persons who are visiting the Gaspe Coast in the vicinity of Perce Rock and Bonaventure Island to view the wonderful colonies of sea birds which breed there under the protection of the government. The increased tourist traffic benefits the whole vicinity.

Similarly the establishment of a sanctuary at Cape May, New Jersey, has brought a large number of autumn and winter visitors to the Cape to see the Hawk flights and the abundant winter bird life. If this is encouraged it will become a very important factor in increasing the number of visitors to the resort and the return to local hotels and business will far exceed any return from the Hawk shooting there which has caused such wide condemnation.

Atlantic City, N. J., has also established a bird sanctuary on Brigantine Island and realizes the value of such an adjunct.

WE ARE delighted to learn from Dr. R. M. Strong that his bibliography of birds is at last being printed thanks to the Field Museum which institution has undertaken the publication. It represents years of work and will be of the greatest benefit to ornithologists (cf. Auk, 1931 p. 31).

IN THE Bulletin of the Massachusetts Audubon Society Mr. Francis H. Allen makes a generous plea for the support of 'The Auk' and 'Bird Banding.' He emphasizes the fact that the thorough knowledge that the public now possesses regarding birds and their habits is the result of the "devoted and patient research" which was carried on by scientific ornithologists in the past and that this work is now being carried on in the same way although much of the results cannot be published on account of lack of funds. If those who are able would support this work by subscribing to these journals many papers that now have to be returned to their writers could be published. The dues for Associate membership in the American Ornithologists' Union are $3.00 per year and for the Northeastern Bird Banding Association $2.00 which includes subscription to the respective journals. Speaking for 'The Auk' we greatly appreciate Mr. Allen's generous gesture and we wonder whether other members of the A. O. U. could not induce more of their friends to support ornithological research in the same way?

FOR THE INFORMATION of any who may be concerned it has recently come to my attention that the provisions of the National Firearms Act, approved June 26, 1934, and intended to curb the possession of sub-machine guns and similar weapons, cover certain types of collecting guns used commonly by naturalists in obtaining specimens.

The Act includes the following definition: "The term 'firearm' means a shot gun or rifle having a barrel of less than eighteen inches in length, or any other weapon, except a pistol or revolver, from which a shot is discharged by an explosive if such weapon is capable of being concealed on the person." Through chance this statement includes the Marble Gamegetter and some models of the Stevens Pocket Rifle, which under this law must be registered on a special form with the Collector of Internal Revenue for the district in which the owner resides. Unless there is compliance with this provision for registry there is liability to a penalty of not more than $2,000 or imprisonment.

There is further provision in the Act that such weapons may not be sold, or transferred by gift, except by payment of a tax of $200.

It is suggested that registry papers be accompanied by a statement that the fact that this law applied to collecting guns has only now been ascertained, since registration is supposed to have been made not later than September 24, 1934.—ALEXANDER WETMORE, U. S. National Museum, Washington, D. C.

WE HAVE received many inquiries about the 'Birds of America' by T. Gilbert Pearson now being widely advertised by the University Society of New York and various dealers. The work was reviewed in 'The Auk' when it first appeared in the 3 volume edition (cf. 'The Auk' 1918, p. 89).

WE LEARN that Mr. J. D. Figgins for many years Director of the Colorado Museum of Natural History resigned in November, 1935, and that Mr. Alfred M. Bailey, Director of the Chicago Academy of Sciences has been appointed to succeed him. Mr. Bailey will assume his new duties about May 1, 1936.

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Edited by Dr. Witmer Stone

ACADEMY OF NATURAL SCIENCES, LOGAN SQUARE

PHILADELPHIA, PA.

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Subscription, $4.00 a year. Single numbers, one dollar.

Free to Honorary Fellows, and to Fellows, Members, and Associates of the A. O. U., not in arrears for dues.

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